



A **tyco** International Ltd. Company



**Annual (June) 2006
Groundwater Monitoring Report
for the
Rose Township Demode Road Site
913 Demode Road
Holly, Michigan**

Prepared For:

Rose Township Settling Defendants
800 Chrysler Drive
Auburn Hills, MI 48326

Prepared By:

Earth Tech, Inc.
36133 Schoolcraft
Livonia, MI 48150

October 31, 2006

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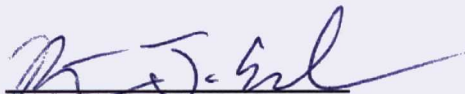
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TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>
1.0	INTRODUCTION.....	1-1
1.1	SITE DESCRIPTION AND BACKGROUND	1-1
1.2	GEOLOGY/HYDROGEOLOGY	1-2
1.3	STATUS OF GROUNDWATER INVESTIGATIONS	1-3
2.0	FIELD AND ANALYTICAL METHODS.....	2-1
2.1	GROUNDWATER ELEVATIONS.....	2-1
2.2	GROUNDWATER SAMPLING PROCEDURES	2-2
2.2.1	<i>Low- Flow Sampling Methods.....</i>	<i>2-2</i>
2.2.2	<i>Natural Artesian Flow Sampling Methods.....</i>	<i>2-3</i>
2.2.3	<i>Active Groundwater Extraction Well Sampling Methods</i>	<i>2-3</i>
2.3	ANALYTICAL METHODS	2-3
2.4	QUALITY ASSURANCE/QUALITY CONTROL SAMPLES.....	2-4
3.0	GROUNDWATER MONITORING RESULTS.....	3-1
3.1	GROUNDWATER ELEVATIONS.....	3-1
3.2	FIELD PARAMETERS	3-2
3.3	ANALYTICAL RESULTS	3-2
3.3.1	<i>Vinyl Chloride</i>	<i>3-3</i>
3.3.2	<i>Cis-1,2-Dichloroethene</i>	<i>3-7</i>
3.3.3	<i>Trichloroethene</i>	<i>3-8</i>
3.3.4	<i>Benzene</i>	<i>3-9</i>
3.3.5	<i>Biogeochemical Data</i>	<i>3-10</i>
3.4	QA/QC RESULTS.....	3-12
4.0	SUMMARY OF JUNE 2006 GROUNDWATER MONITORING EVENT	4-1
5.0	GROUNDWATER EXTRACTION AND TREATMENT SYSTEM PERFORMANCE	5-1
5.1	COMPLIANCE	5-1
5.2	SYSTEM MODIFICATIONS	5-1
5.3	SYSTEM OPERATIONS.....	5-2

TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>
6.0	PLANNED PROJECT ACTIVITIES	6-1

LIST OF FIGURES

<u>Figure</u>	<u>Title</u>
Figure 1	Site Map and Well Locations
Figure 2	Groundwater Level Elevation Contour Map – June 2006
Figure 3	Summary of Detected Volatile Organic Compounds – June 2006
Figure 4	VC and TCE Isoconcentration Map – June 2006
Figure 5	Summary of Historical TCE and VC Concentrations
Figure 6	DNR-6 VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 7	DNR-7 VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 8	GW-5I VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 9	GW-5D VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 10	GW-6D VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 11	GW-17I VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 12	GW-17D VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 13	GW-18 VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 14	GW-19S VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 15	GW-20D VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 16	MW-21 VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 17	MW-3I VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 18	MW-103S VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 19	RW-1D VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 20	RW-5S VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 21	RW-5D VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 22	PW-1 VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 23	PW-3 VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 24	PW-6 VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 25	PW-7 VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 26	PW-8 VC, TCE, and Cis-1,2-DCE Concentrations Over Time
Figure 27	SVE and Groundwater Systems Location Map

LIST OF TABLES

<u>Table</u>	<u>Title</u>
Table 1	Summary of Groundwater Level Elevations – June 2006
Table 2	Summary of VOC Analytical Results in Groundwater Samples – June 2006
Table 3	Summary of Historical VOC Analytical Results in Groundwater
Table 4	Summary of Biogeochemical and Field Parameters in Groundwater
Table 5	Summary of Analytical Influent and Effluent Data
Table 6	Summary of Removal Rate and Mass Removed
Table 7	Summary of Operational Data

LIST OF APPENDICES

Appendix A	Technical Memorandum - Extraction Well Pumping Rate Increase and Capture Zone Analysis
Appendix B	Summary of Operating Flow Rates

1.0 INTRODUCTION

This groundwater monitoring report documents field activities and analytical results from the June 2006 (Annual 2006) groundwater sampling activities conducted at the Rose Township Demode Road Site (Site), located at 913 Demode Road, Holly, Michigan (Figure 1). A total of 56 groundwater monitoring wells were purged and sampled between June 12 and 21, 2006, using either low-flow pumping methods or by use of natural artesian conditions. Groundwater level measurements were collected from 102 groundwater monitoring wells, 4 piezometers, and 6 staff gauges on June 16, 2006. This report summarizes the methods and procedures used during the monitoring event, the results of the June 2006 field activities, and an analysis of the current groundwater extraction system and modifications made to improve operation.

1.1 SITE DESCRIPTION AND BACKGROUND

The Site is comprised of approximately 110 acres and is located in the northwestern corner of Oakland County. Regional topography consists primarily of broad flat plains with numerous shallow depressions and valleys occupied by lakes, ponds, wetlands, and streams. These plains are traversed by a series of southwest to northeast trending ridges formed by glacial end moraines. The topography of Oakland County and all of southeastern Michigan is dominated by glacial features created during the retreat of the Saginaw lobe of the Laurentide ice sheet during the Wisconsin Glacial Stage (approximately 10,000 to 20,000 years ago). The regional elevation ranges from approximately 630 to 1,220 feet above mean sea level (ft. AMSL). The area receives on average 30 inches of precipitation per year. Average monthly temperatures range from 23 °F (January) to 72 °F (July).

The Site was used as an unlicensed landfill for industrial wastes from the mid 1960s until approximately 1971 when Rose Township brought a second law suit against the waste hauler and the land owner. The illegal disposal activities were conducted on approximately 12 acres of the upland portion of the Site. In 1979 the Michigan Department of Environmental Quality (MDEQ), formerly the Michigan Department of Natural Resources (MDNR), conducted a drum survey on the property and identified approximately 1,500 drums on Site. A large number of these drums were severely deteriorated and had apparently released their contents. Based on

this survey and the subsequent sampling of the identified drums, an interim remedial action was conducted by the MDEQ to remove the drums. By July 1980, more than 5,000 drums were identified and removed from the Site by the MDEQ.

Since 1980, the Site has been the subject of numerous investigations and remedial response activities, as summarized below:

- 1980 to 1982 – Initial Site investigation conducted by the MDEQ.
- 1982 – Site becomes part of the Federal Superfund program. A Remedial Investigation/Feasibility Study (RI/FS) is initiated.
- 1986 – The MDEQ conducts additional groundwater delineation activities.
- 1987 – Cleanup plan selected. Record of Decision (ROD) issued requiring Incineration of polychlorinated biphenyl (PCB) contaminated soil and extraction and treatment of contaminated groundwater with discharge to wetlands.
- 1989 - ROD Amendment #1 - Soil Flushing is added to the ROD as a soil remedy.
- 1992-1993 – Incineration of 50,000 cubic yards of PCB contaminated soil.
- 1995 – ROD Amendment #2 – Soil vapor extraction (SVE) chosen for remaining contaminated soils. Target cleanup levels (TCLs) for volatile organic compounds (VOCs) in soil were also amended.
- 1995 – 1996 – Both SVE and groundwater extraction/treatment systems designed and constructed.
- 1997 – Earth Tech is subcontracted for the operation, maintenance, and monitoring (OM&M) of the Site.
- 2002 – Dissolved vinyl chloride concentrations detected beyond the groundwater system capture zone.
- 2004 – Dissolved vinyl chloride concentrations detected at northeast boundary of the Site. Earth Tech begins off-Site delineation activities.
- 2005-2006 – Hydrologic Study is conducted to determine the interaction between surface water and groundwater at the Site.

1.2 GEOLOGY/HYDROGEOLOGY

The Site is located on a glacial end-moraine and represents a local topographic high which serves as a local recharge area for the shallow aquifer. Site topography ranges from approximately 950 to 1,100 ft. AMSL. The surface water runoff from the Site drains to wetland areas that border the Site on the northeast and west.

The regional geology consists of approximately 250 to 300 feet of glacial drift underlain by bedrock comprised of the Mississippian-aged Coldwater Shale and Marshall Formation (sandstone unit). The glacial drift is composed of complex stratifications of clay tills, outwash

deposits (sand and gravel), and ice contact deposits (silts and silty clays). Lacustrine deposits (silt and clay) are also common in the topographically lower lying flat areas and are gradational and interbedded with glacial outwash deposits.

The shallow Site geology consists of complex interbedded glacial deposits (silt to gravelly sands) underlain by clay till that appears to be laterally continuous across the Site and surrounding area. This till layer is considered the base of the aquifer of interest at the Site. In the northeastern and western portions of the Site (the topographically lower areas comprised of wetlands) these water bearing silts and sands are overlain by interbedded lacustrine clays. These interbedded lacustrine clays produce semi-confining conditions for the aquifer causing wells in the lower elevation portions of the Site (areas below approximately 990 ft. AMSL) to flow under natural artesian pressure.

The Site is within an area of complex hydrogeology. The soil below the Site is composed of interbedded clay, silt, sand and gravel. The percentage of each material composing the aquifer affects the direction and velocity of groundwater flow, resulting in changes in the direction and nature of the dissolved contaminant plume. Groundwater flow is generally from south to north across the southern two thirds of the Site, toward well DNR-7 (Figure 2). This portion of the Site, located on a topographic high, acts as a local groundwater recharge area. North of well DNR-7, on the northern third of the property, there is a marked decrease in ground surface and aquifer elevation. Just north of this area the aquifer becomes artesian due to the presence of the interbedded lacustrine clays and a corresponding drop in topography. The aquifer pinches and thins out toward the north, which corresponds to a change in groundwater flow direction to the east-northeast towards the wetlands that are present on the northeastern portion of the Site.

1.3 STATUS OF GROUNDWATER INVESTIGATIONS

A dissolved VOC plume has been detected in the water bearing zone beneath the Site. Trichloroethene (TCE) and its degradation products, cis-1,2-dichloroethene (cis-1,2-DCE) and vinyl chloride (VC), are the most prevalent VOCs in groundwater beneath the Site. TCE is encountered mainly in wells on the south end of the Site near the existing building. VC has been observed in wells near the area of the on-Site building extending to, and possibly beyond,

the northeast property boundary. To monitor the groundwater plume at the Site, 35 monitoring wells are sampled quarterly with an additional 21 wells sampled on an annual basis.

The potential for off-Site groundwater contamination was considered based on the observed VC concentrations in groundwater at the Site property boundary, and the detection of low concentrations of VC in a residential supply well at 510 Demode Road. The residents of this home utilize bottled water for drinking, and the well is sampled on a monthly basis. VC concentrations in samples from this well have ranged from 0.4 µg/L to 3.5 µg/L since 2003, with the most recent sample (June 2006) containing VC at 2.7 ug/L.

To investigate whether this VC originates at the Site, eight monitoring wells, including GW-22S, GW-22I, GW-22D, GW-23S, GW-23I, GW-23D, GW-24I, and GW-24D were installed off-Site on the opposite side of the wetlands east of the Site (Figure 1). These off-Site wells are sampled quarterly and to date have shown no detectable levels of dissolved VOCs.

To fill possible data gaps and further refine the understanding of the Site hydrogeology and VOC contaminant migration mechanisms, four additional off-Site monitoring wells, MW-25I, MW-25D, MW-26I and MW-26D were installed in April 2006 (Figure 1). Analytical results for samples collected from these wells in June 2006 did not contain detectable concentrations of VC or other VOCs except GW-26D. The sample from GW-26D contained a concentration of toluene (1.6 µg/L) just above the laboratory method detection limit.

2.0 FIELD AND ANALYTICAL METHODS

Groundwater gauging and sampling activities were performed at the Site between June 12 and 21, 2006. With the exception of the natural flowing artesian wells, the groundwater monitoring wells were purged and sampled using low-flow minimal draw-down techniques. The artesian wells were purged using the natural flow-pressures at the wellhead. The field practices and procedures used for the groundwater monitoring wells during the June 2006 annual groundwater monitoring event were consistent with those established during previous quarterly monitoring events. Twenty-three of the fifty-six wells sampled this quarter were purged using a peristaltic pump and dedicated tubing. Twelve of the fifty-six wells were sampled using a bladder pump and dedicated tubing. Fifteen wells were purged and sampled using natural artesian flow. Six active recovery wells were also sampled. A brief description of the groundwater gauging, sampling, and analyses are provided below.

2.1 GROUNDWATER ELEVATIONS

On June 16, 2006, Earth Tech collected static groundwater level measurements from 102 monitoring wells, 4 piezometers, and 6 staff gauges located both on-Site and off-Site (Table 1 and Figure 3). The groundwater levels from the flowing artesian wells were measured using a sealed k-packer wellhead assembly with a pressure transducer capable of reading water levels to an accuracy of 0.01 feet. Prior to gauging the wells, the transducer was calibrated and any difference in vertical distance from the calibration point to the water surface was noted and recorded so that the readings could be corrected later if necessary. The device was set on top of each well casing and the pressure head was allowed to stabilize before it was recorded in units of feet of water above the top of the well casing (ATOC). The water levels from the stainless steel monitoring wells (GW-1S, GW-2, GW-3S, GW-4S, and GW-6S) were not measured as the larger inside diameter of the casing prevented the k-packer assembly from creating a water tight seal, thus allowing leakage around the k-packer device and preventing an accurate water level reading.

The groundwater levels from the non-flowing wells were measured to within 0.01 feet, using an electronic water level indicator. The distance from the top of the well casing to the groundwater

potentiometric surface in the well was measured and recorded as the static water level (SWL). The groundwater level elevations were calculated by subtracting the SWL from the TOC elevation. The water level indicator was decontaminated prior to each use. The active extraction wells, PW-1, PW-3, PW-7, and PW-8, were not gauged as the water levels in these wells are not representative of static groundwater elevations. Groundwater levels from inactive extraction well PW-5 and active extraction wells, PW-4 and PW-6, were also not measured as these wells are under uncontrollable artesian conditions.

2.2 GROUNDWATER SAMPLING PROCEDURES

Groundwater sampling was conducted between June 12 and 21, 2006. Details summarizing the sampling procedures for the low-flow pumping method and natural artesian flow methods are provided in the following sections.

2.2.1 LOW-FLOW SAMPLING METHODS

A total of thirty-five (35) groundwater monitoring wells were purged using low-flow methods, utilizing either a peristaltic pump (23 wells) or a bladder pump (12 wells), at flow rates ranging from 100 to 500 milliliters per minute. During the installation of the tubing for the peristaltic pump or the placement of the bladder pump, care was taken to minimize disturbance of the stagnant water column in the well. If a bladder pump was used to purge the well, the pump was installed in the well and left in place for at least one hour to equilibrate with the water column before purging commenced.

Field parameters, including pH, temperature, conductivity, dissolved oxygen, oxidation reduction potential (ORP), salinity, and turbidity, were collected and recorded throughout purging activities. With the exception of turbidity, field parameter readings were measured in-line using a sealed flow-through cell and multi-parameter analyzer. Turbidity readings were obtained using an extracted water sample and a separate optical turbidity meter. Groundwater purging continued until the pH, temperature, and conductivity parameters were observed within ± 10 percent of the average of three measurements taken five minutes apart. Once the groundwater quality parameters stabilized, the tubing was removed from the flow-through cell and the sample

collected directly from the discharge line of the peristaltic or bladder pump. The discharge flow rate was decreased, as necessary, to maintain laminar flow while filling the sample bottles. All purge water was disposed through the on-Site groundwater remediation treatment system.

2.2.2 NATURAL ARTESIAN FLOW SAMPLING METHODS

A total of fifteen (15) monitoring wells were purged using natural artesian flow. The flowing artesian wells were sampled using a sealed k-packer wellhead assembly with a small diameter hose barb at the other end. A short section of hose attached this assembly to a flow diversion valve which controlled the amount of water flowing into the flow-through cell. The water flow into the cell was only reduced far enough not to damage the flow through cell. Field parameters were collected and recorded throughout purging activities, as described above for the low-flow sampling method. All purge water was disposed through the on-Site groundwater remediation treatment system.

2.2.3 ACTIVE GROUNDWATER EXTRACTION WELL SAMPLING METHODS

Six active groundwater extraction wells were sampled during the June 2006 annual sampling event. These well samples were collected through sample collection ports built into the piping between the groundwater treatment system and each well. Field parameters, including pH, temperature, conductivity, dissolved oxygen, ORP, salinity, and turbidity, were collected and recorded prior to the collection of the analytical sample.

2.3 ANALYTICAL METHODS

Groundwater samples were collected at fifty-six monitoring well locations. Thirty-five wells including DNR-1, DNR-4D, DNR-6, DNR-7, GW-4D, GW-5I, GW-6D, GW-17I, GW-17D, GW-18, GW-19S, GW-19D, GW-20D, GW-20I, GW-21S, GW-21D, GW-22S, GW-22I, GW-22D, GW-23S, GW-23I, GW-23D, GW-24I, GW-24D, GW-25I, GW-25D, GW-26I, GW-26D, MW-3I, MW-102D, MW-103S, PW-7, PW-8, RW-1D, and RW-5S were analyzed for the following parameters by Trimatrix Laboratories, of Grand Rapids, Michigan:

- Volatile Organic Compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method 8260B
- Biogeochemical Parameters:
 - Dissolved gases (methane, ethane, ethene) by RSK 175
 - Inorganics (ammonia, nitrate/nitrite, sulfate, chloride) by USEPA 300 Series Methods
 - Total organic carbon (TOC), and alkalinity (total) by USEPA Series 300 and 400 Methods

In addition to the laboratory analytical methods listed above, groundwater from each well was measured in the field for sulfide and dissolved metals (iron and manganese). These field measurements were obtained using colorimetric methods with a Hach DR 850 instrument, after the well was purged and the field parameters had stabilized.

Twenty-one wells including DNR-3, DNR-5, DNR-6, GW-1I, GW-3I, GW-6I, GW-12I, GW-12D, GW-16, MW-2I, MW-107I, MW-108D, MW-109D, PW-1, PW-3, PW-4, PW-6, PW-9, RW-1, RW-2, and RW-17 were analyzed only for VOCs by EPA Method 8260B.

2.4 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Quality assurance quality control (QA/QC) samples were collected to monitor the effectiveness of the decontamination procedures and to identify any field or laboratory conditions that may affect sample integrity. QA/QC samples included the following:

- **Duplicate Samples** - Duplicate samples were collected from six monitoring wells. The wells selected for duplicate sample collection were DNR-5, GW-19S, GW-20D, GW-26D, RW-1D, and RW-2. For each sample obtained, a duplicate set of sample containers was filled immediately following collection of the original sample. Each duplicate sample was handled and analyzed in a fashion identical to the monitoring well samples.
- **Rinsate Samples** - Five rinsate (equipment blank) samples were collected following standard decontamination procedures. Equipment blank samples were collected at a frequency of one sample per day when non-dedicated equipment was being used. For each equipment blank sample, deionized water was poured through the decontaminated sampling equipment and collected in a set of sample containers. Each equipment blank sample was handled and analyzed in a fashion identical to the monitoring well samples.

- **Matrix Spike/Matrix Spike Duplicates (MS/MSD)** - MS/MSD samples were collected from three monitoring wells. The wells selected for MS/MSD sample collection included GW-4D, GW-5I, and MW-109D. For each sample, one additional set of sample containers was filled immediately following the collection of the corresponding original sample and submitted for laboratory QA/QC purposes. Each MS/MSD sample was handled and analyzed in a fashion identical to the monitoring well samples.
- **Field Blank Samples** – Four field blank samples were collected during the sampling event. Field blank samples were collected at a frequency of one for every two days of sampling. Field blank samples were collected by filling a set of VOC bottles with laboratory de-ionized water and leaving the caps off the bottle while conducting the sampling at a monitoring well. Field blank samples were collected during the sampling of wells GW-21S, GW-22I, GW-25I, and MW-103S.
- **Trip Blank Samples** - One laboratory-prepared trip blank sample was transported with each cooler containing more than one groundwater sample submitted for VOC analysis. The trip blank sample was only analyzed for VOCs.

All QA/QC and monitoring well samples were placed directly into appropriately preserved sample containers, as prepared and provided by the analytical laboratory. All sample bottles were labeled, packed in coolers, and transported to the analytical laboratory under proper chain-of-custody procedures.

3.0 GROUNDWATER MONITORING RESULTS

A total of fifty-six groundwater monitoring wells were purged and sampled during the June 2006 Annual groundwater monitoring event. All samples were analyzed for VOCs and thirty-five wells were analyzed for biogeochemical indicator parameters. A total of 25 QA/QC samples including equipment blanks, field blanks, duplicates, MS/MSDs, and trip blanks were also collected.

VC, TCE, and cis-1,2-DCE are the primary VOCs at the Site based on the detected concentrations and frequency of detections in groundwater. The concentrations of these and other VOCs detected during the June 2006 Annual monitoring event are summarized in Table 2. A summary of historically detected VOCs is provided as Table 3.

The June 2006 annual groundwater monitoring results are summarized and discussed in the following sections.

3.1 GROUNDWATER ELEVATIONS

Water levels were measured in 102 groundwater monitoring wells, 4 piezometers, and 6 staff gauges on June 16, 2006. These water level data are summarized in Table 1.

The groundwater level elevations ranged from 1,014.61 ft. AMSL at well RW-10, located in the central portion of the property, to 980.01 feet AMSL at monitoring well GW-22S, located off-Site and east of the northeast corner of the Site. The groundwater flow direction on-Site is generally from south to north at a horizontal gradient of approximately 0.002 feet/foot (ft/ft) across the southern and central portions of the property. The groundwater flow direction becomes more northeasterly near the northern property boundary (near wells DNR-6 and GW-10) and a strong easterly component becomes apparent between well cluster MW-102 and well cluster GW-19 (Figure 2). The groundwater gradient increases to approximately 0.006 ft/ft between these two well clusters.

3.2 FIELD PARAMETERS

Groundwater field parameters monitored during well purging activities included temperature, pH, conductivity, dissolved oxygen, turbidity, and ORP. When these parameters stabilize, the purge water is then considered to be representative of groundwater conditions within the water-bearing unit. A general discussion and summary of the stabilization parameters recorded during purging is provided below.

- **Temperature:** Groundwater temperatures ranged from 9.17 (GW-24D) to 15.73 (DNR-5) °C.
- **pH:** Groundwater pH ranged from 7.33 (PW-8) to 9.87 (GW-26D). The pH at monitoring well GW-12D, which is not typically sampled, was 10.65.
- **Conductivity:** Groundwater conductivities ranged from 678 (PW-8) to 277 (DNR-6) micro siemens per centimeter ($\mu\text{S}/\text{cm}$). The conductivity in GW-12D was 182 $\mu\text{S}/\text{cm}$.
- **Dissolved Oxygen:** Dissolved oxygen values ranged from 5.87 (PW-9) to 0.08 (GW-103S) mg/L.
- **Turbidity:** Groundwater turbidity ranged from less than 1 (multiple wells) to 7.6 (GW-12I) nephelometric turbidity units (NTUs).
- **ORP:** Groundwater ORP ranged from -195 (GW-12I) to +391 (PW-8) millivolts (mV).

The field parameters recorded during the June 2006 annual sampling event are generally consistent with historical observations with the exception of monitoring well GW-12D which is not normally sampled. The low dissolved oxygen and ORP values observed in most monitoring wells is indicative of ambient anaerobic conditions.

3.3 ANALYTICAL RESULTS

The VOC concentrations detected in June 2006 Annual are summarized in Table 2. A table showing historical VOC concentrations is provided as Table 3.

The VOC analytical results are compared to the TCLs developed in the ROD (EPA, September 30, 1987). These TCLs are further subdivided into Phase I and Phase II TCLs as identified in the *Remedial Design and Remedial Action Work Plan* (Fred C. Hart Associates, Inc., et al,

September 18, 1989). The detected VOC concentrations were also compared to the current MDEQ Remediation and Redevelopment Division (MDEQ-RRD) Part 201 Generic Cleanup (Part 201) Residential Drinking Water, Groundwater Surface Water Interface (GSI), Groundwater Contact Criteria and the 2004 Federal Drinking Water Maximum Contaminant Levels (MCLs).

In general, VOCs were detected in twenty-two of the fifty-six monitoring wells sampled in June 2006 (Table 2). No VOCs were detected in thirty-four monitoring wells (DNR-1, DNR-3, DNR-4D, DNR-5, GW-1I, GW-3I, GW-4D, GW-6I, GW-6D, GW-12I, GW-12D, GW-16, GW-19D, GW-20I, GW-21S, GW-21D, GW-22S, GW-22I, GW-22D, GW-23S, GW-23I, GW-23D, GW-24I, GW-24D, GW-25I, GW-25D, GW-26I, MW-102D, MW-107I, MW-108D, MW-109D, PW-9, RW-2, and RW-17). VOCs that were detected, but did not exceed the Part 201 Criteria, MCLs, or the ROD TCLs, include acetone, carbon disulfide, chlorobenzene, chloroform, chloroethane, 1,1-dichloroethane, trans-1,2-dichloroethene, ethylbenzene, toluene, and 1,1,1-trichloroethane. The detected VOCs that exceeded one or more ROD TCL, Part 201, and/or MCL criterion are summarized below.

3.3.1 VINYL CHLORIDE

Vinyl chloride (VC) is the most prevalent VOC at the Site, detected in seventeen of the fifty-six monitoring wells sampled during this monitoring event. The detected VC concentrations in groundwater samples ranged from 1.4 $\mu\text{g/L}$ (RW-5S) to 140 $\mu\text{g/L}$ (GW-5I). The dissolved VC plume begins near well PW-3 (located southeast of the groundwater treatment system building) and extends north to northeast to the property boundary near wells GW-19S and GW-20D (Figure 4). The VC concentrations detected in groundwater across the Site between September 2005 and June 2006 are summarized on the following table. A map showing the historical distribution of VC concentrations across the Site is provided as Figure 5.

ROD TCLs for Vinyl Chloride		2004 Federal Drinking Water MCL for Vinyl Chloride ($\mu\text{g/L}$)	Part 201 Criteria for Vinyl Chloride ($\mu\text{g/L}$)		
Phase I TCLs	Phase II TCLs		Residential Drinking Water	Groundwater Surface Water	Groundwater Contact Criteria
1	0.003	2	2	15	1,000
Well ID	Monitoring Event	Observed Vinyl Chloride Concentrations ($\mu\text{g/L}$)			
DNR-6	September 2005	100			
	December 2005	Frozen			
	April 2006	30			
	June 2006	33			
DNR-7	September 2005	100			
	December 2005	130			
	April 2006	120			
	June 2006	110			
GW-5I	September 2005	180			
	December 2005	200			
	April 2006	160			
	June 2006	140			
GW-6D	September 2005	98			
	December 2005	72			
	April 2006	12			
	June 2006	ND			
GW-17I	September 2005	24			
	December 2005	Frozen			
	April 2006	19			
	June 2006	9			
GW-17D	September 2005	22			
	December 2005	Frozen			
	April 2006	20			
	June 2006	20			
GW-18	September 2005	43			
	December 2005	Frozen			
	April 2006	38			
	June 2006	43			
GW-19S	September 2005	12			
	December 2005	Frozen			
	April 2006	7.5			
	June 2006	5.6			

ROD TCLs for Vinyl Chloride		2004 Federal Drinking Water MCL for Vinyl Chloride ($\mu\text{g/L}$)	Part 201 Criteria for Vinyl Chloride ($\mu\text{g/L}$)		
Phase I TCLs	Phase II TCLs		Residential Drinking Water	Groundwater Surface Water	Groundwater Contact Criteria
1	0.003	2	2	15	1,000
Well ID	Monitoring Event	Observed Vinyl Chloride Concentrations ($\mu\text{g/L}$)			
GW-20D	September 2005	20			
	December 2005	25			
	April 2006	26			
	June 2006	24			
MW-2I	June 2004	24			
	June 2005	21			
	June 2006	20			
MW-3I	September 2005	23			
	December 2005	26			
	April 2006	28			
	June 2006	28			
PW-1	June 2004	86			
	June 2005	31			
	June 2006	20			
PW-3	June 2004	5.9			
	June 2005	2.4			
	June 2006	1.7			
PW-4	June 2004	7.7			
	June 2005	5.3			
	June 2006	3.7			
PW-6	June 2004	87			
	June 2005	71			
	June 2006	24			
PW-7	September 2005	Not Sampled			
	December 2005	Not Sampled			
	April 2006	100			
	June 2006	45			
PW-8	September 2005	Not Sampled			
	December 2005	Not Sampled			
	April 2006	4.3			
	June 2006	2.4			

ROD TCLs for Vinyl Chloride		2004 Federal Drinking Water MCL for Vinyl Chloride ($\mu\text{g/L}$)	Part 201 Criteria for Vinyl Chloride ($\mu\text{g/L}$)		
Phase I TCLs	Phase II TCLs		Residential Drinking Water	Groundwater Surface Water	Groundwater Contact Criteria
1	0.003	2	2	15	1,000
Well ID	Monitoring Event	Observed Vinyl Chloride Concentrations ($\mu\text{g/L}$)			
RW-1D	September 2005	ND			
	December 2005	2.1			
	April 2006	ND			
	June 2006	ND			
RW-5S	September 2005	5.0			
	December 2005	2.4			
	April 2006	1.7			
	June 2006	1.4			

Notes:

MCL = Maximum Contaminant Level

Shaded areas indicate that the concentration exceeds the MCL Part 201 or ROD Criteria.

Although the trends in VC concentrations over time vary between different individual monitoring wells while the general distribution of VC across the Site has remained relatively consistent. Graphs showing detailed VC, TCE, and cis-1,2-DCE concentration trends over time (for wells with detectable concentrations of these VOCs) are provided as Figures 6 through 28. Overall decreasing VC concentration trends are apparent in monitoring wells GW-5D, GW-6D, MW-3I, RW-5S, RW-5D, PW-1, PW-3, PW-6, PW-7, and PW-8. With the exception of RW-5S and RW-5D, these wells are all located in the vicinity of pumping wells PW-1, PW-4, and PW-6. RW-5S and RW-5D are located in the vicinity of pumping well PW-3. Overall increasing VC concentration trends are seen in monitoring wells GW-18 and GW-20D, which are both located in the northeastern portion of the Site. The VC concentration at wells DNR-6, DNR-7, GW-5I, GW-17I, GW-17D, GW-19S, MW-2I, and MW-103S are generally stable. Of note however, between the July and September 2005 sampling events, several wells show either a sharp increase (RW-5S located near PW-3, GW-17I, and to a lesser extent GW-19S, located down gradient of the northernmost pumping wells PW-4 and PW-6) or decrease (GW-17D) in VC

concentrations. As discussed more in Section 5.0 of this document, the groundwater treatment system was not operating for two months, between August 1 and October 1 2005, for maintenance of the air stripping tower. The concentration changes observed in the wells noted above may be associated with the period of system inactivity.

Table 3 and Figure 5 present historical VC data. To date, VC has not been observed in the off-Site well clusters GW-22I/S/D, GW-23I/S/D, GW-24I/D GW-25I/D and GW-26I/D, located further down gradient. With the exception of low concentrations of carbon disulfide and toluene, VOCs have not been detected at these off-site wells.

3.3.2 CIS-1,2-DICHLOROETHENE

Concentrations of cis-1,2-dichloroethene (cis-1,2-DCE) were detected in groundwater samples collected from eight of the fifty-six monitoring wells sampled in June 2006. The cis-1,2-DCE concentrations ranged from 2.1 $\mu\text{g/L}$ at well MW-102D to 230 $\mu\text{g/L}$ at well DNR-7. The wells where cis-1,2-DCE was detected, and the reported concentrations, are provided in the table below. cis-1,2-DCE is typically observed in the north central portion of the site.

2004 Federal Drinking Water MCL for cis-1,2- DCE ($\mu\text{g/L}$)	MDEQ Part 201 Residential Drinking Water Criteria for cis-1,2-DCE ($\mu\text{g/L}$)	cis-1,2-DCE Analytical Results ($\mu\text{g/L}$) June 2006							
		DNR-7	GW-5D	MW-103S	PW-1	PW-6	PW-7	RW-1	RW-1D
70	70	230	79	2.1	19	4.5	56	5.4	18

Notes:

MCL = Maximum Contaminant Level

Shaded areas indicate that the concentration exceeds the MCL Part 201 Criteria. No ROD TCLs were established for cis-1,2-DCE.

Graphs showing detailed VC, TCE, and cis-1,2-DCE concentration trends over time (for wells with detectable concentrations of these VOCs) are provided as Figures 6 through 28. Over the last several sampling events the cis-1,2-DCE concentrations, where detected, have remained generally stable with a few exceptions. Slight decreasing concentration trends are evident in the recent data from wells RW-5S, GW-5D, PW-7 and PW-8. A strong decreasing trend is apparent at well MW-103S, located near the center of the site.

3.3.3 TRICHLOROETHENE

Trichloroethene (TCE) was detected in groundwater samples collected from four of the fifty-six monitoring wells sampled in June 2006. The detected concentrations ranged from 1.7 µg/L at well PW-3 and 43 µg/L at well RW-1D. The wells where TCE was detected, and the reported concentrations, are provided in the table below. TCE and VC isoconcentration contours are shown in Figure 4.

ROD TCLs for TCE		2004 Federal Drinking Water MCL for TCE (µg/L)	Part 201 Residential Drinking Water Criteria for TCE (µg/L)	TCE Analytical Results (µg/L) June 2006			
Phase I TCLs (µg/L)	Phase II TCLs (µg/L)			RW- 1D	RW-1	PW-3	PW-8
1.5	0.627	5	5	43	1.9	1.7	3.0

Notes:

MCL = Maximum Contaminant Level

Shaded areas indicate that the concentration exceeds the ROD, MCL, or Part 201 Criteria.

The TCE concentrations reported in June 2006 are generally consistent with those observed in recent sampling events. The apparent spike in TCE concentrations at well RW-1D in April 2006 (from 61 µg/l in December 2005 to 150 µg/l in April 2006) has decreased in June 2006 to

concentrations consistent with historical concentrations for this well (43 µg/l). To date, the furthest down gradient location at which TCE has been routinely detected is at pumping well PW-8. TCE has not been observed at any of the newest down gradient wells and boundary wells, including the GW-17, GW-18, GW-19, GW-20 and GW-21 series, or any of the off-Site monitoring wells. A map showing the historical distribution of TCE and VC concentrations across the Site is provided as Figure 5.

Graphs showing detailed VC, TCE, and cis-1,2-DCE concentration trends over time (for wells with detectable concentrations of these VOCs) are provided as figures 6 through 28. In the wells where TCE has historically been detected, overall decreasing trends are evident in monitoring wells RW-5S, and pumping well PW8, while the TCE concentrations at RW-1D have remained relatively stable.

3.3.4 BENZENE

Benzene was detected in the groundwater sample collected from three of the fifty-six monitoring wells sampled. The detected concentrations ranged from 3.8 µg/L at well PW-3 and 4.8 µg/L at well PW-7. Benzene is sporadically observed in the central portion of the site. An isoconcentration map for benzene was not prepared. A summary of the benzene detections are provided in the table below.

ROD TCLs for Benzene		2004 Federal Drinking Water MCL for Benzene (µg/L)	Part 201 Residential Drinking Water Criteria for Benzene (µg/L)	Benzene Analytical Results (µg/L) June 2006		
Phase I TCLs (µg/L)	Phase II TCLs (µg/L)			MW-21	PW-3	PW-7
1.5	0.133	5	5	3.9	3.8	4.8

Notes:

MCL = Maximum Contaminant Level

Shaded areas indicate that the concentration exceeds the ROD, MCL, or Part 201 Criteria.

The occurrence of benzene is generally consistent with previous sampling events.

3.3.5 BIOGEOCHEMICAL DATA

Thirty-five of the fifty-six groundwater samples collected in June 2006 were analyzed for biodegradation indicators including methane, ethane, ethene, nitrate/nitrite, ammonia, chloride, sulfate, total alkalinity, and total organic carbon. Additional biogeochemical parameters were collected in the field from all thirty-five wells, including dissolved oxygen, ORP, dissolved iron, dissolved manganese, and sulfide. These parameters are used to determine the aerobic/anaerobic condition of the aquifer. In general, electron acceptors progress from oxygen to nitrate, manganese, iron, sulfate and methane, with oxygen indicating the aerobic end of the scale and methane indicating the anaerobic end of the scale.

A summary of the June 2006 biogeochemical results is provided in Table 4. The dissolved metals analytical results are also provided in Table 4. A summary of the biogeochemical and metals results obtained during this sampling event is provided as follows:

Field Measurements

Dissolved Oxygen: Dissolved oxygen values ranged from 0.08 (GW-103S) to 5.87 (PW-9) mg/L (see Section 3.2).

ORP: Groundwater ORP ranged from -195 (GW-12I) to +391 (PW-8) millivolts (mV) (see Section 3.2).

Sulfide: Sulfide concentrations ranged from 0.00 mg/L (multiple wells) to 0.57 mg/L (DNR-1).

Dissolved Iron: Dissolved iron concentrations ranged from 0.03 mg/L (GW-26I) to 2.88 mg/L (RW-5S).

Dissolved Manganese: Dissolved manganese concentration ranged from 0.00 mg/L (multiple wells) to 5.50 mg/L (GW-21D).

Laboratory Results

Methane: Methane was detected in thirty-two of thirty-five wells sampled, at concentrations ranging from Non Detectable (GW-25D) to 190 µg/L (RW-17).

Ethane: Ethane was detected in one of the thirty-five wells sampled. Ethane was detected in GW-6I at a concentration of 13 µg/L.

Ethene: Ethene was detected in ten of the thirty-five wells sampled at concentrations ranging from 1.5 µg/L (GW-23D) to 7 µg/L (DNR-7).

Nitrate/Nitrite: Nitrite and Nitrate were not detected in any of the wells sampled.

Sulfate: Sulfate was detected in twenty-eight of the thirty-five wells sampled, at concentrations ranging from 6.8 (GW-3I) to 30 mg/L (GW-22I).

Ammonia: Ammonia was detected in twenty-seven of the thirty-five wells sampled at concentrations ranging from 0.060 mg/L (GW-22D) to 0.25 mg/L (DNR-1).

Chloride: Chloride concentrations ranged from 1.5 mg/L (DNR-1) to 14 mg/L (GW-6I).

Total Alkalinity: Total alkalinity concentrations ranged from 120 mg/L (GW-6I) to 350 mg/L (MW-108D).

Total Organic Carbon: Total organic carbon content ranged from below the reporting limit of 1.0 mg/L (GW-23S) to 18 mg/L (GW-6I).

Based on a review of these data, the aquifer appears to be under predominantly anaerobic conditions, although neither strongly anaerobic nor aerobic conditions are apparent. Weakly aerobic conditions, as indicated by the elevated DO and ORP levels are present in GW-16. Elevated concentrations of methane in DNR-7, GW-17D, and RW-17 suggest that methanogenesis (anaerobic degradation) may be occurring at these locations. The overall low values for ORP are more indicative of anaerobic conditions.

3.4 QA/QC RESULTS

Analytical results for the QA/QC samples collected during the June 2006 sampling event are summarized below.

Trip Blanks

Seven trip blank samples were submitted to the lab for analysis of VOCs. Six of the seven samples contained no detectable concentration of any VOC. The trip blank sample submitted to the laboratory with the samples from June 21, 2006, had a concentration of acetone of 710 µg/L. However, none of the samples submitted with this trip blank had detectable levels of acetone. Therefore no data qualification is necessary based on this detection. None of the seven trip blank samples had elevated reporting limits (RLs).

Field Blanks

Five field blank samples were submitted to the laboratory for analysis of VOCs. All five samples contained no detectable concentration of any VOC. None of the five field blank samples had elevated reporting limits (RLs).

Equipment Blanks

Five equipment blank samples were submitted to the laboratory for analysis of VOCs. All five samples contained non-detectable concentrations of all VOCs. None of the five equipment blank samples had elevated reporting limits (RLs).

Duplicate Samples

Duplicate samples (DNR5/DNR5R, GW19S/GW19R, GW20D/GW-20R, GW26D/GW26R, RW1D/RW1R, and RW2/RW2R) were reviewed for field precision within 50% relative percent difference (RPD).

Laboratory Method Blanks

All laboratory method blanks were non-detect for all VOCs. No samples were qualified because of method blanks.

Laboratory Control Samples

The laboratory control sample (LCS) for batch 0606408 was outside of the laboratory control limits for tetrahydrofuran. The CRL for batches 6061536, 6062026, 6062241 was outside of the laboratory control limits for chloride. The CRL for batches 6061647 and 6062739 was outside of the laboratory control limits for ammonia. The CRL for batches 6062137 and 6062138 was outside of the laboratory control limits for nitrate. The CRL for batches 6062156, 6062225, 6062241 was outside of the laboratory control limits for total organic carbon. However, no data was qualified as a result of the LCS samples.

MS/MSDs

In two instances where the matrix spike/matrix spike duplicate (MS/MSD) recoveries were outside of control limits, the relative percent difference (RPD) was within the control limits. No groundwater data were qualified as a result of these two laboratory MS/MSD samples. However, in two other instances where matrix spike/matrix spike duplicate (MS/MSD) recoveries were outside of control limits, the relative percent difference (RPD) was not within the control limits. Sample MW109D was qualified with an estimated flag for bromomethane. Sample GW24D was qualified as estimated from total organic carbon.

Holding Times

All groundwater samples were analyzed within the recommended holding times for each analysis.

4.0 SUMMARY OF JUNE 2006 GROUNDWATER MONITORING EVENT

Water levels were collected from a total of 102 groundwater monitoring wells, 4 piezometers, and 6 staff gauges on June 16, 2006. Purging and sampling activities were performed on forty-four on-site and twelve off-site wells between June 12 and 21, 2006 following appropriate technical and quality control procedures. All groundwater samples were submitted to Trimatrix Laboratories for analysis. All samples were analyzed within recommended holding times following strict quality control procedures.

In June 2006, groundwater elevations increased an average of 0.27 feet since the last monitoring event in April 2006. The groundwater flow direction on-Site is generally from south to north in the southern and central portions of the property. The groundwater flow direction becomes more northeasterly near the northern property boundary (near wells DNR-6 and GW-10) and a strong easterly component becomes apparent between well cluster MW-102 and well cluster GW-19 (Figure 2). The groundwater gradient increases to approximately 0.006 ft/ft between these two well clusters. Groundwater flow may extend eastward from the area near GW-19 toward off-Site wells near Demode Road; however, only toluene has been detected in any groundwater monitoring wells on the east side of the wetland, despite the low level occurrence of VC in off-Site private supply wells.

The distribution of dissolved VOCs in the aquifer is generally consistent with historical patterns. Overall, concentrations of TCE, cis-1,2-DCE, and VC are either stable or decreasing across the Site, with the exception of wells GW-18 and GW-20D, located near the northeastern property corner. VC concentrations in these wells have shown an overall increasing trend.

Several groundwater monitoring wells located in the vicinity of pumping wells PW-3, PW-4 and PW-6, including RW-5S, GW-17I, GW-17D, and to a lesser extent, GW-19S, show distinct VC concentration changes between July and September 2005 which may be related to the treatment system down time between August and October 2005.

5.0 GROUNDWATER EXTRACTION AND TREATMENT SYSTEM PERFORMANCE

The groundwater extraction and treatment system consists of six extraction wells and an air stripping system that is designed to remove VOCs from the groundwater as detailed in Figure 27. Monitoring of the groundwater is conducted in accordance with the Substantive Requirements Document for Surface Water Discharge (Permit No. MIU990014).

The extraction well network was reconfigured in March 2004. Extraction well PW-9 was replaced with PW-3, and PW-5 was replaced with PW-1. The former active extraction wells were PW-4, PW-5, PW-6, PW-7, PW-8, and PW-9. The current active extraction wells are PW-1, PW-3, PW-4, PW-6, PW-7, and PW-8.

5.1 COMPLIANCE

Table 5 provides a summary of the influent and effluent analyses, and weekly average air emission rates for the twelve-month period from July 1, 2005 through June 30, 2006. The weekly monitoring data indicates that the treatment system was in compliance with Section A.1 of the Substantive Requirements Document MIU990014.

On January 13, 2006, following review of the previously submitted Spike SVE Test Report, the MDEQ granted permission to shut-down the SVE system. The SVE system was shut down on January 20, 2006. The site has been compliant with the air quality standards in the existing permit for the groundwater and soil vapor extraction (SVE) systems. Average hourly air emission rates from the ground water treatment system for each weekly sampling period from the air stripper were calculated for the current reporting period (July 1, 2005 through June 30, 2006). The air emission rates for the air stripper system ranged from none to 0.0164 pounds per hour (lbs/hr) during this reporting period. The permitted allowable emissions for both the SVE and air stripper systems are 1.0 lbs/hr VOC.

5.2 SYSTEM MODIFICATIONS

A number of issues were encountered during operation of the groundwater treatment system throughout the reporting period. These issues and the corrective measures taken to remedy them are discussed below.

The air stripping tower was cleaned on August 1, 2005. During the cleaning process, packing media began to fall through the support grate of the air stripper tower, indicating a failure of the media support grate. Upon investigation, it was noted that the metal support had corroded, apparently as a result of repeated acid cleanings. The tower media and support grate were removed from the air stripper tower. The stripping tower was repaired during September 2005, and the system was re-started on October 1, 2005.

PW-8 was not operable during the period of July 2005 to March 2006 due to iron fouling. Cleaning of all six pumping wells was performed in March and April 2006. Normal operations of PW-8 were resumed after the cleaning was performed.

PW-1, PW-3, PW-4, PW-6, and PW-7 were operated at reduced flows and/or were temporarily shut down to control flow capacity of the air stripper during the period of July 2005 to December 2005. Both PW-4 and PW-6 experienced minor electrical problems, which caused the pumps to be shut down during the months of April 2006 and May 2006, respectively.

The air stripper blower motor and the air flow sensor in the groundwater treatment system failed and were replaced on November 4, 2005 and December 20, 2005, respectively. The system was down between November 15, 2005 and December 20, 2005. A technical memorandum summarizing extraction well pumping rate increase and capture zone analysis was submitted to the USEPA and the MDEQ on July 21, 2006. A copy of the technical memorandum is provided as Appendix A. The capture zone analyses concluded that limited plume capture is occurring at the current pumping rates (PW-1 at 59 gpm, PW-4 at 45 gpm, and PW-6 at 71 gpm). Additional evidence of the limited plume capture is provided by the low concentrations of VC detected in the downgradient monitoring wells. The capture zone analyses indicated that the proposed increase in pumping rates (PW-1 at 130 gpm, PW-4 at 60 gpm, and PW-6 at 120 gpm) is capable of providing complete capture of the plume.

5.3 SYSTEM OPERATIONS

The system has removed an estimated 426.69 lbs of VOCs from the groundwater to date since startup of the groundwater collection and treatment system on February 10, 1996. For this reporting period of July 1, 2005, to June 30, 2006, 24.88 lbs of VOCs have been removed from

the groundwater. The approximate daily removal rate during this reporting period is included in Table 6.

Table 7 and Appendix B provide the flow monitoring data and estimated hours of operation for the period of July 1, 2005 through June 30, 2006. Table 7 summarizes the average daily flow rate, average hours of operation per day, percentage of operation and notes on causes of down-time for each of the six pumping wells. A brief operational summary for each well is also provided as follows:

- **PW-1:** This well was temporarily out of service in July 2005 due to an electric short. In the months of August 2005 and September 2005, PW-1 was not operating due to the repairs on the air stripper tower. In November 2005 and December 2005, PW-1 was operated intermittently due to the failure of the air stripper blower motor. During the reporting period, PW-1 has been 72% operational.
- **PW-3:** Due to the fouling of the air stripper packing media, this well was operated at a lower flow in July 2005 to avoid flooding of the air stripper tower. In the months of August 2005 and September 2005, PW-3 was not operating to accommodate the repairs on the air stripper tower. In November 2005 and December 2005, PW-3 was operated intermittently due to the failure of the air stripper blower motor. During the reporting period, PW-3 has been 70% operational.
- **PW-4:** In the months of August 2005 and September 2005, PW-4 was not operating due to the repairs on the air stripper tower. The well operated intermittently in October 2005, due to repairs on the transmission line. In November 2005 and December 2005, PW-4 was operated intermittently due to the failure of the air stripper blower motor. In April 2006, the well was operated intermittently due to a minor electrical problem. During this reporting period, PW-4 has been 65% operational.
- **PW-6:** This well was operational intermittently in July 2005 due to the failure of the booster pump. In the months of August 2005 and September 2005, PW-6 was not operating due to the repairs on the air stripper tower. In November 2005 and December 2005, PW-6 was operated intermittently due to the failure of the air stripper blower motor. PW-6 experienced periodic autonomous "shut-downs" in May 2006 due to minor electrical problems. During this reporting period, PW-6 has been 70% operational.

- PW-7: Due to the fouling of the air stripper packing media, this well was operated at a lower flow in July 2005 to avoid flooding of the stripper tower. In the months of August 2005 and September 2005, PW-7 was not operating due to the repairs on the air stripper tower. In November 2005 and December 2005, PW-7 was operated intermittently due to the failure of the air stripper blower motor. During this reporting period, PW-7 has been 65% operational.
- PW-8: This well was not operational between July 2005 and March 2006 due to iron fouling. PW-8, along with other wells, was cleaned during the March 2006 and April 2006 cleaning event. During this reporting period, PW-8 has been 22% operational.

6.0 PLANNED PROJECT ACTIVITIES

The next two quarterly groundwater sampling events for 2006 are planned to take place in September and December 2006. The next cleaning for the air stripper tower is tentatively scheduled for October 2006. Cleaning of selected pumping wells is tentatively scheduled for spring 2007.

Figures

FIGURE 6
DNR-6
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan



FIGURE 7
DNR-7
VC, Tce, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan



FIGURE 8
GW-5I
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan

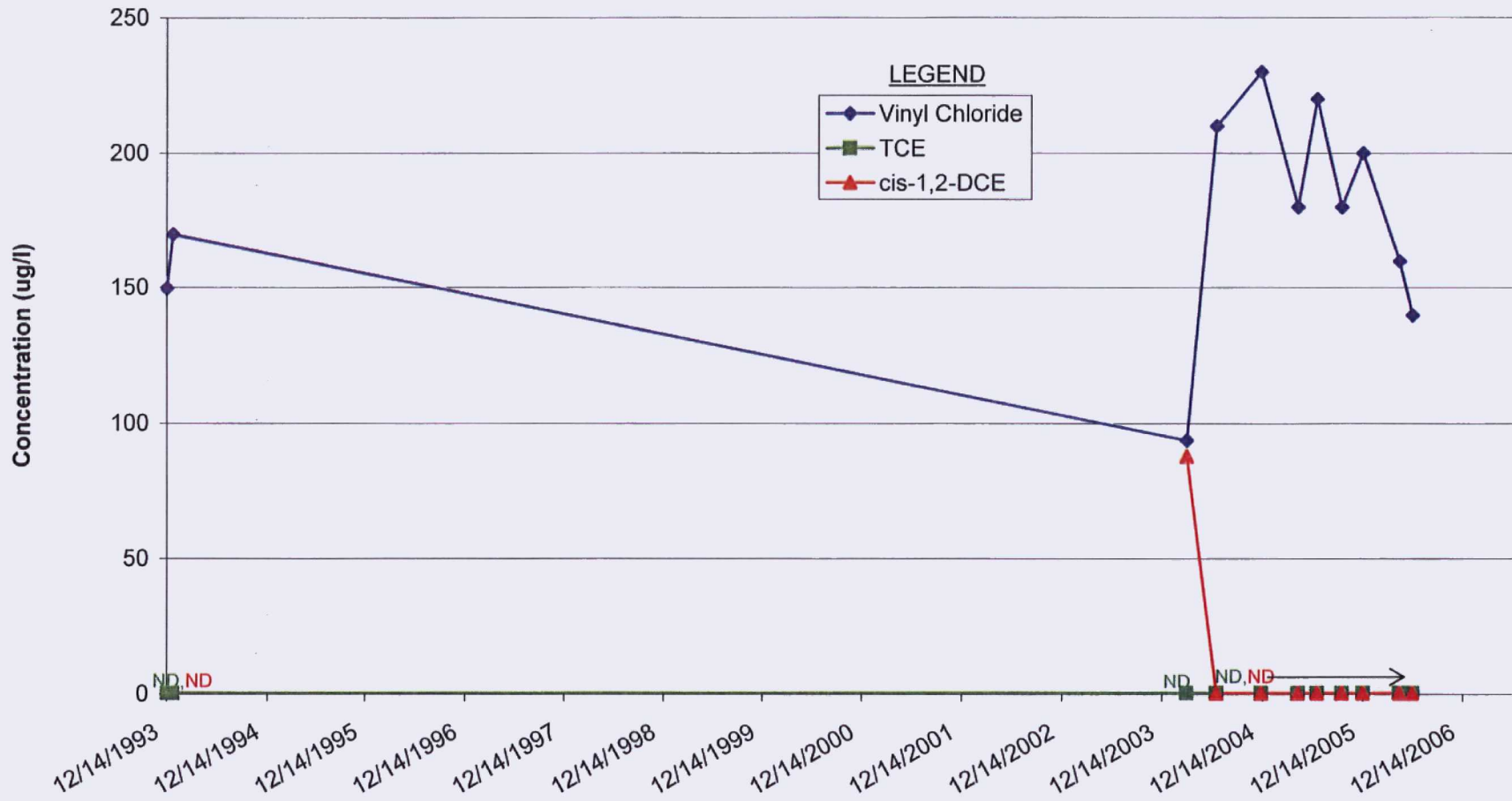


FIGURE 9
GW-5D
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan

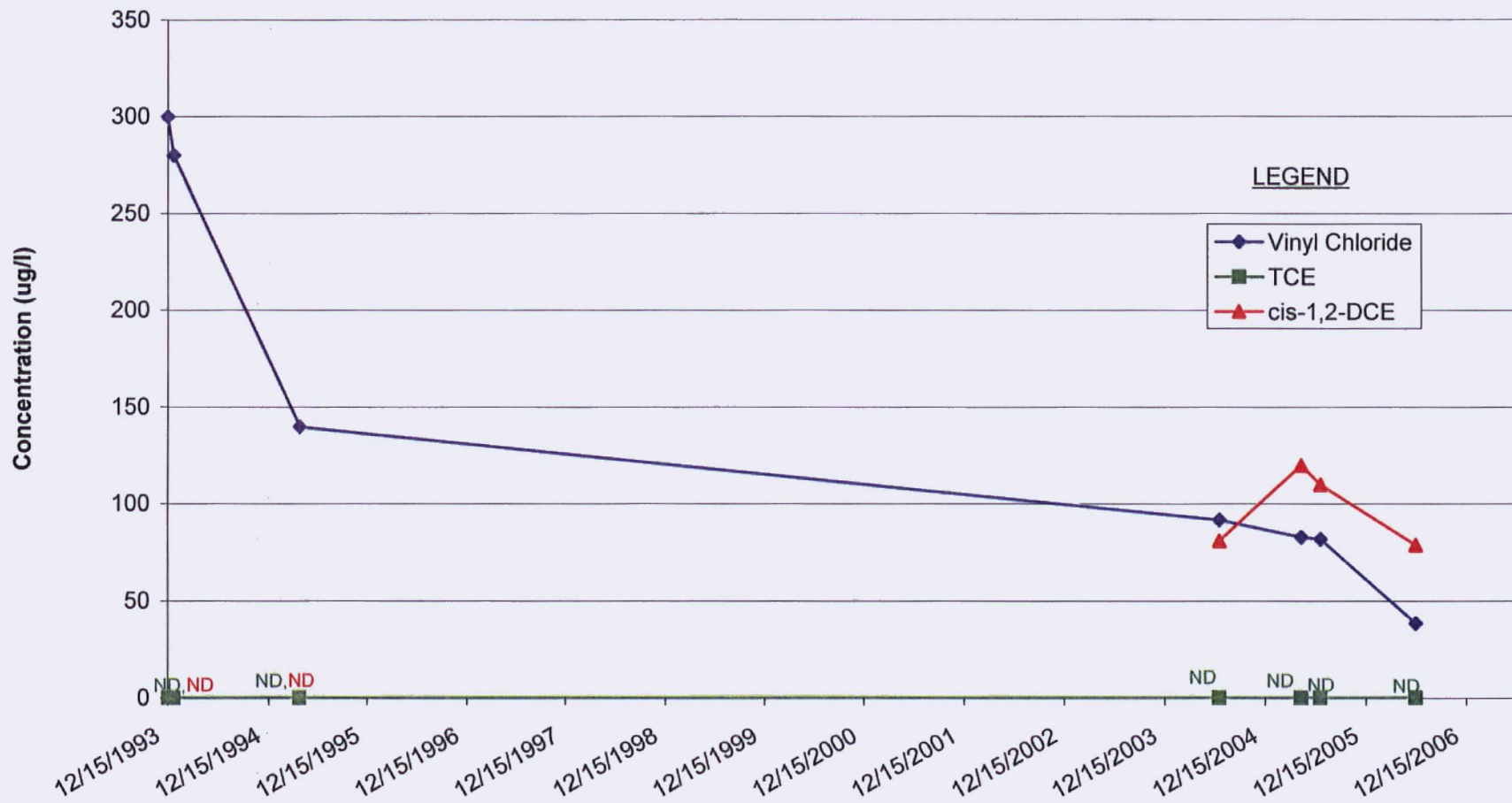


FIGURE 10
GW-6D
VC, Tce, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan



FIGURE 11
GW-171
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan



FIGURE 12
GW-17D
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan



FIGURE 13
GW-18
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan

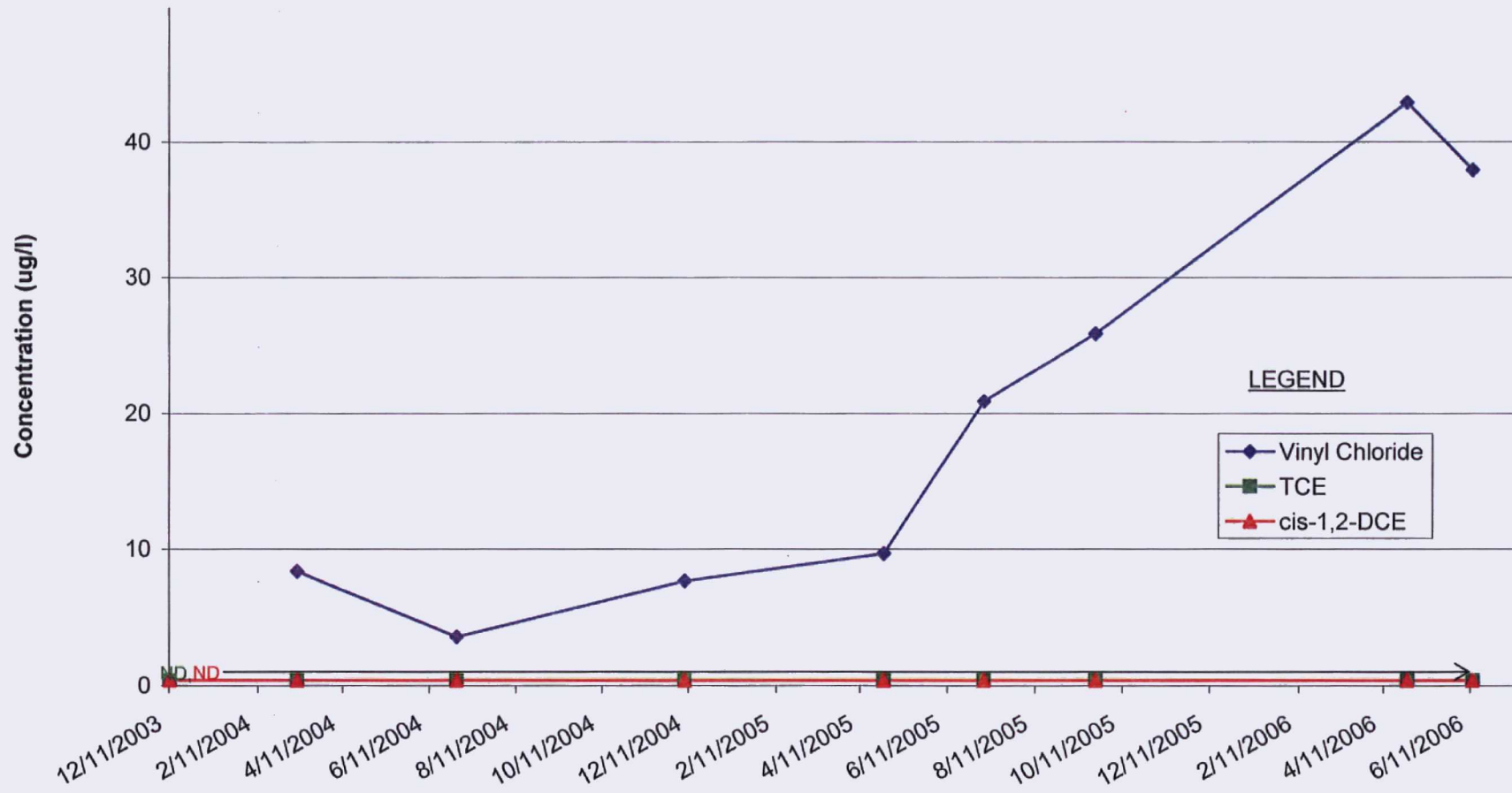


FIGURE 14
GW-19S
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan



FIGURE 15
GW-20D
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan



FIGURE 16
MW-2I
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan



FIGURE 17
MW-3I
VC, Tce, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan



FIGURE 18
MW-103S
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan

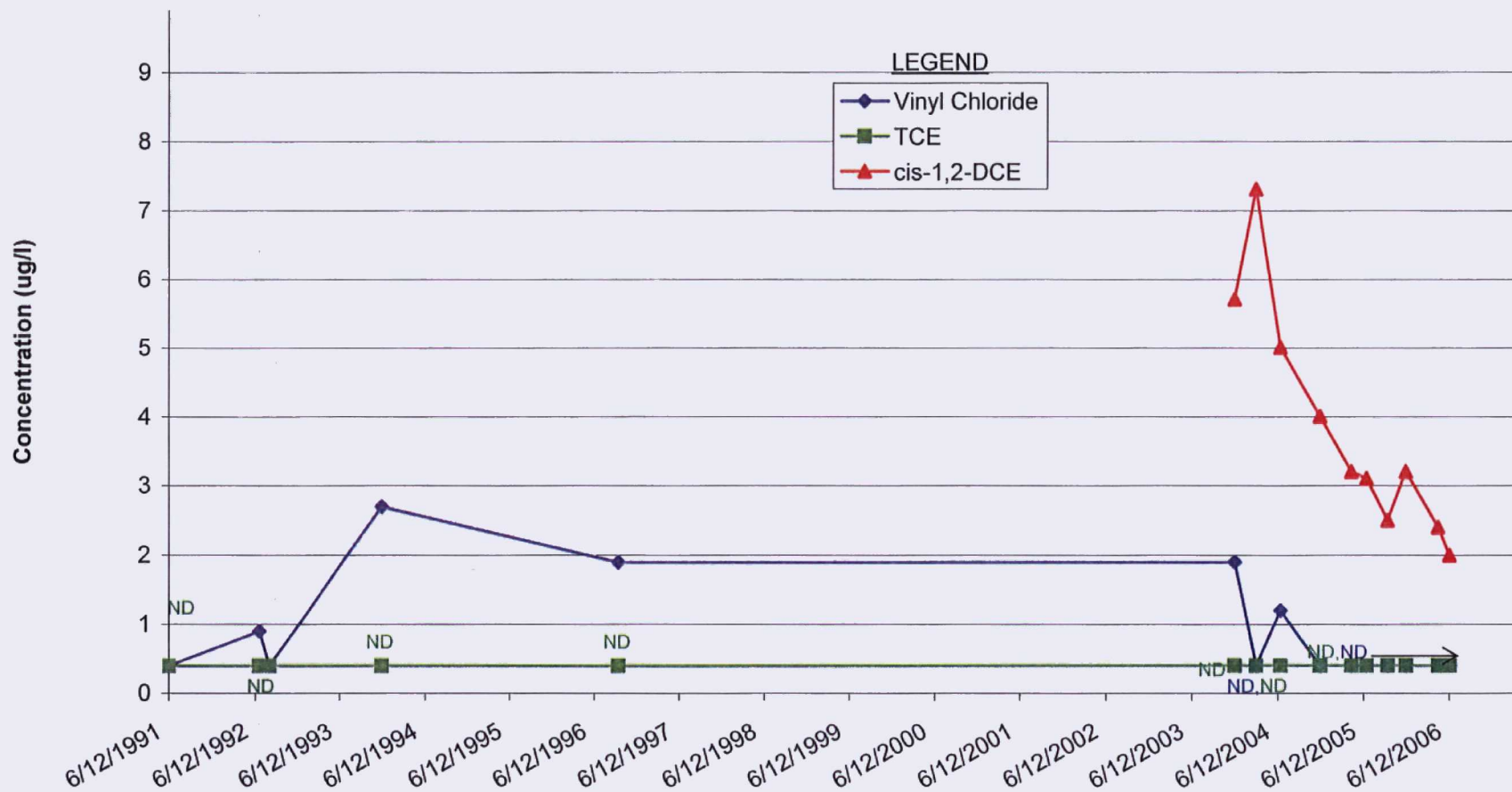


FIGURE 19
RW-1D
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan

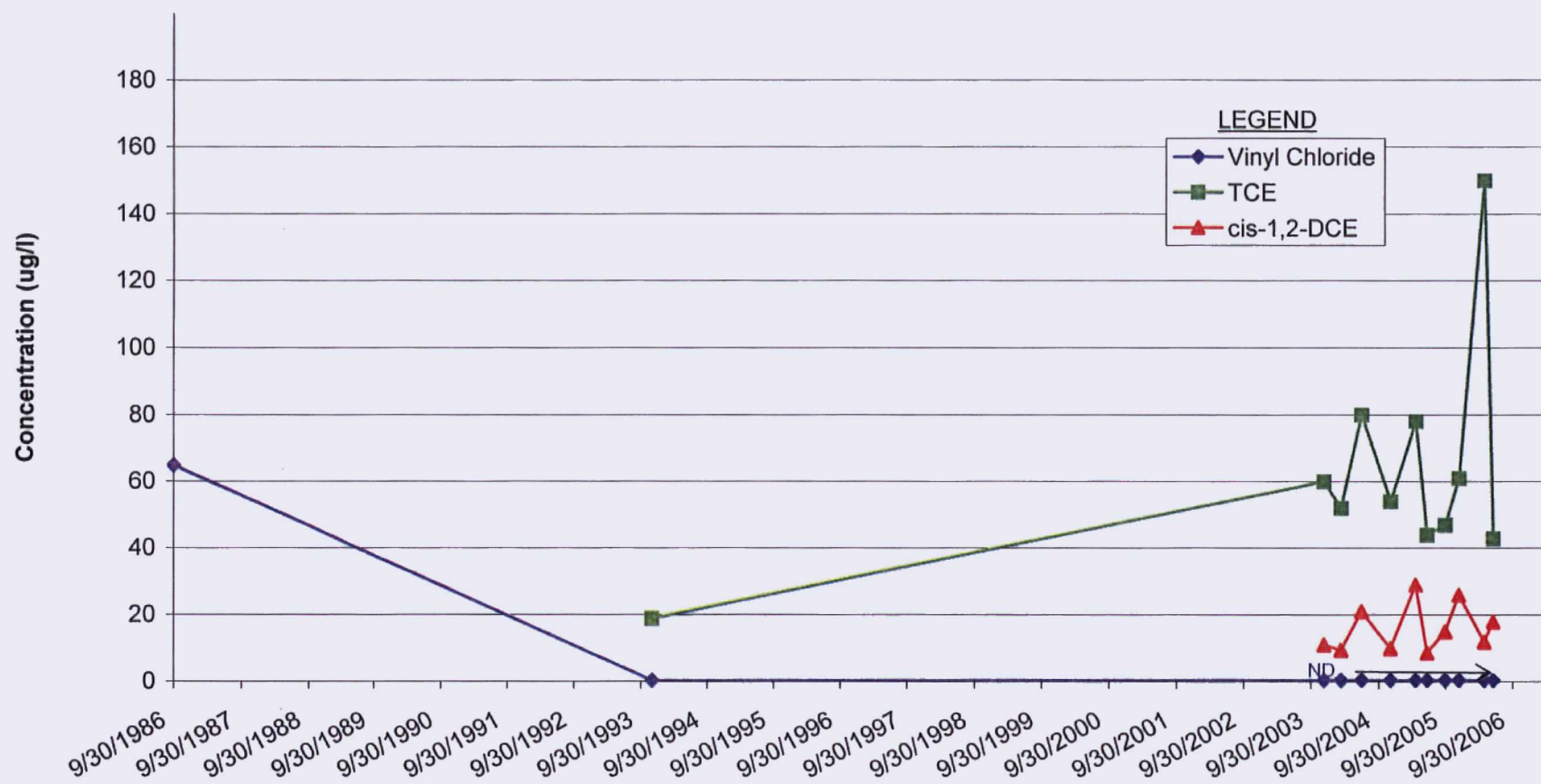


FIGURE 20
RW-5S
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan

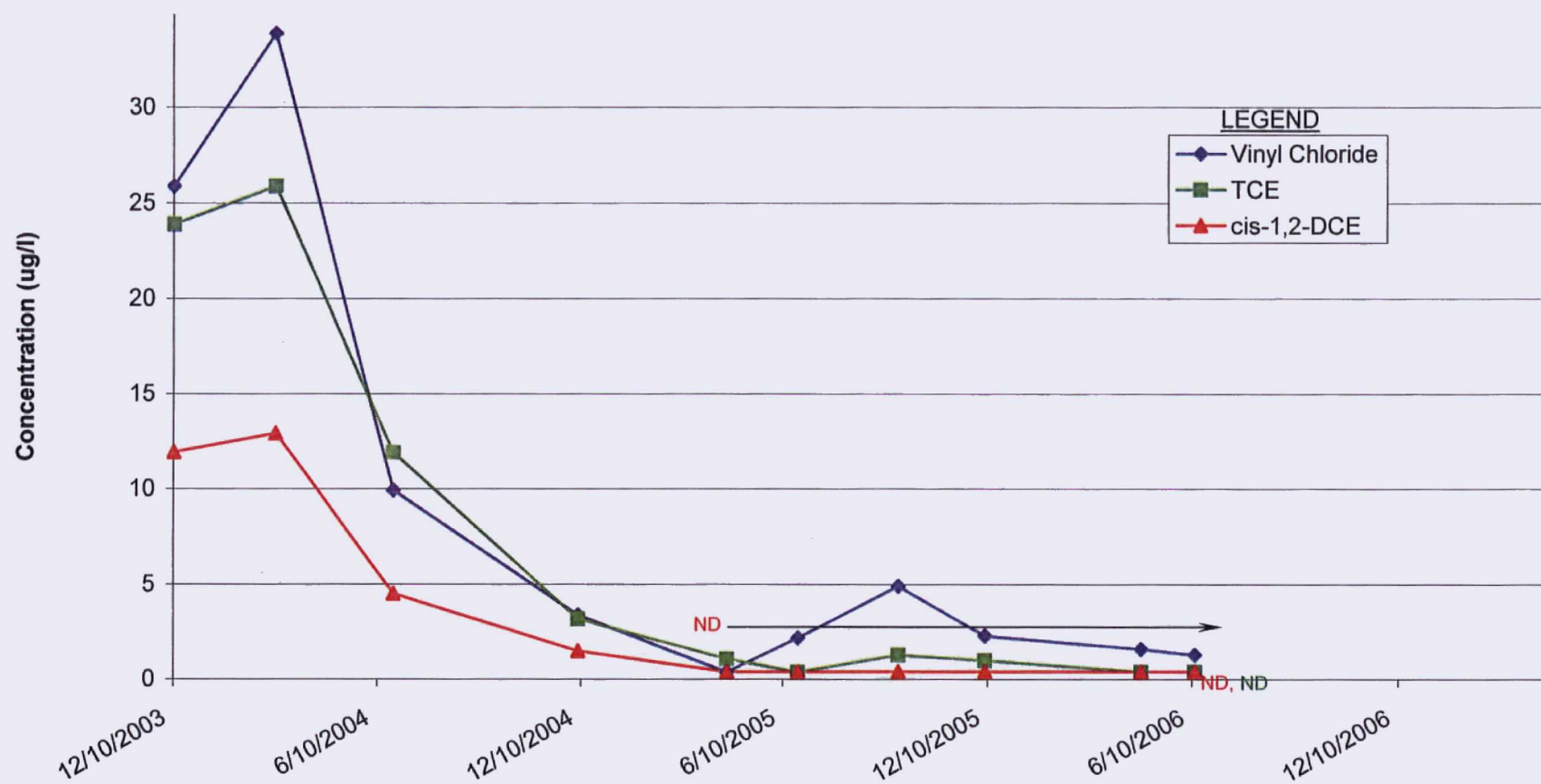


FIGURE 21
RW-5D
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan

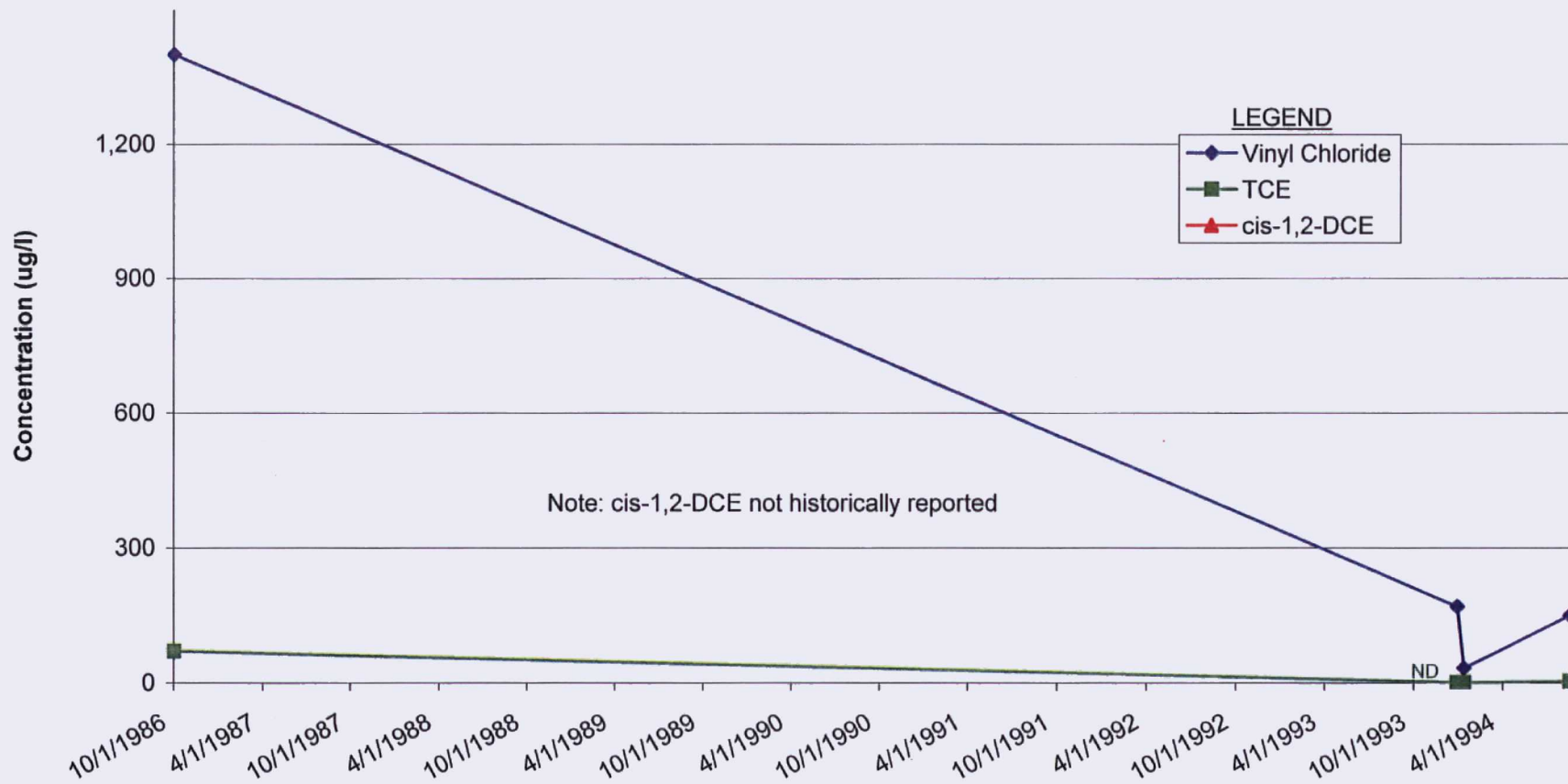


FIGURE 22
PW-1
VC, TCE and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan

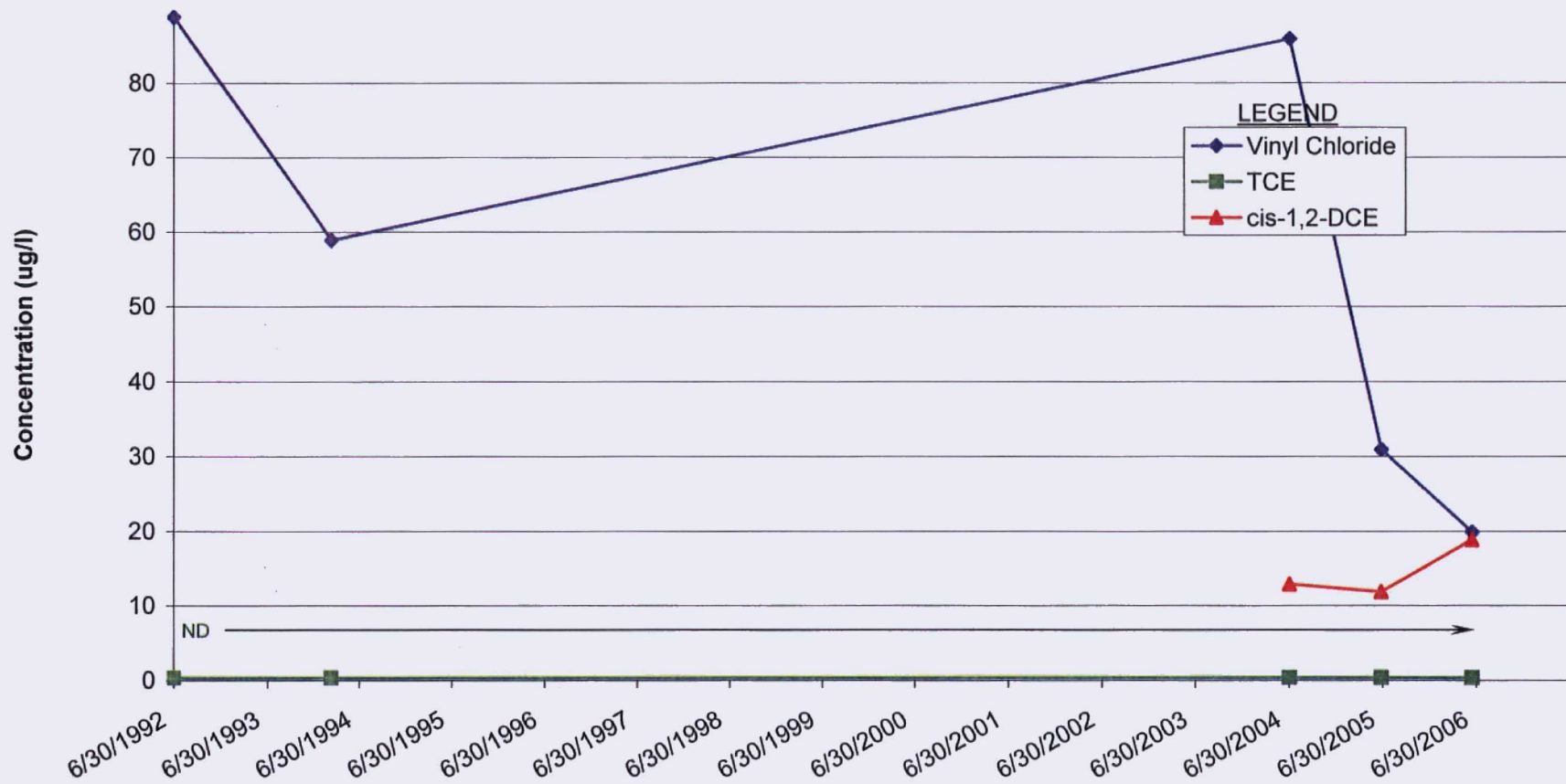


FIGURE 23
PW-3
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan

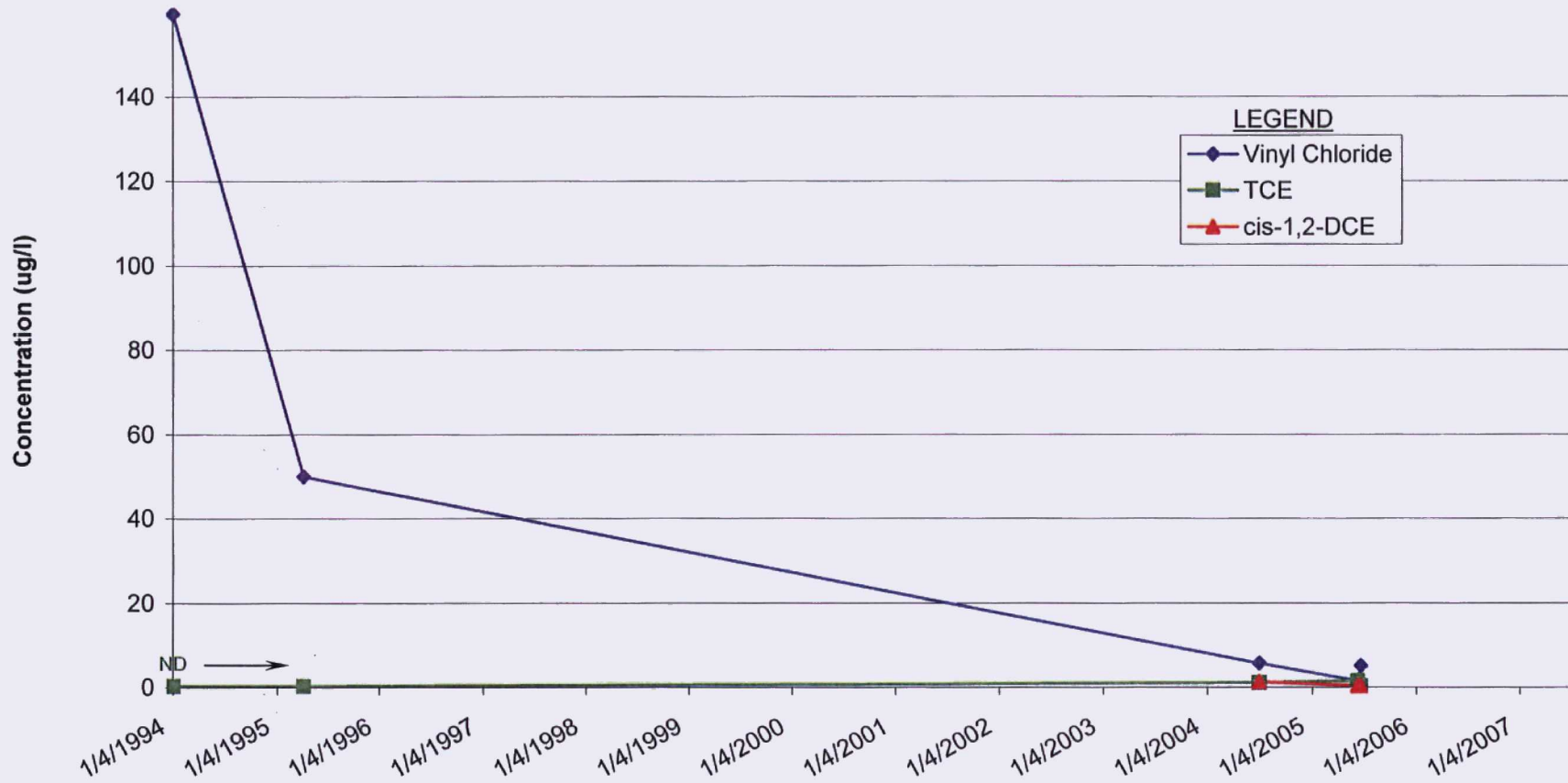


FIGURE 24
PW-6
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan

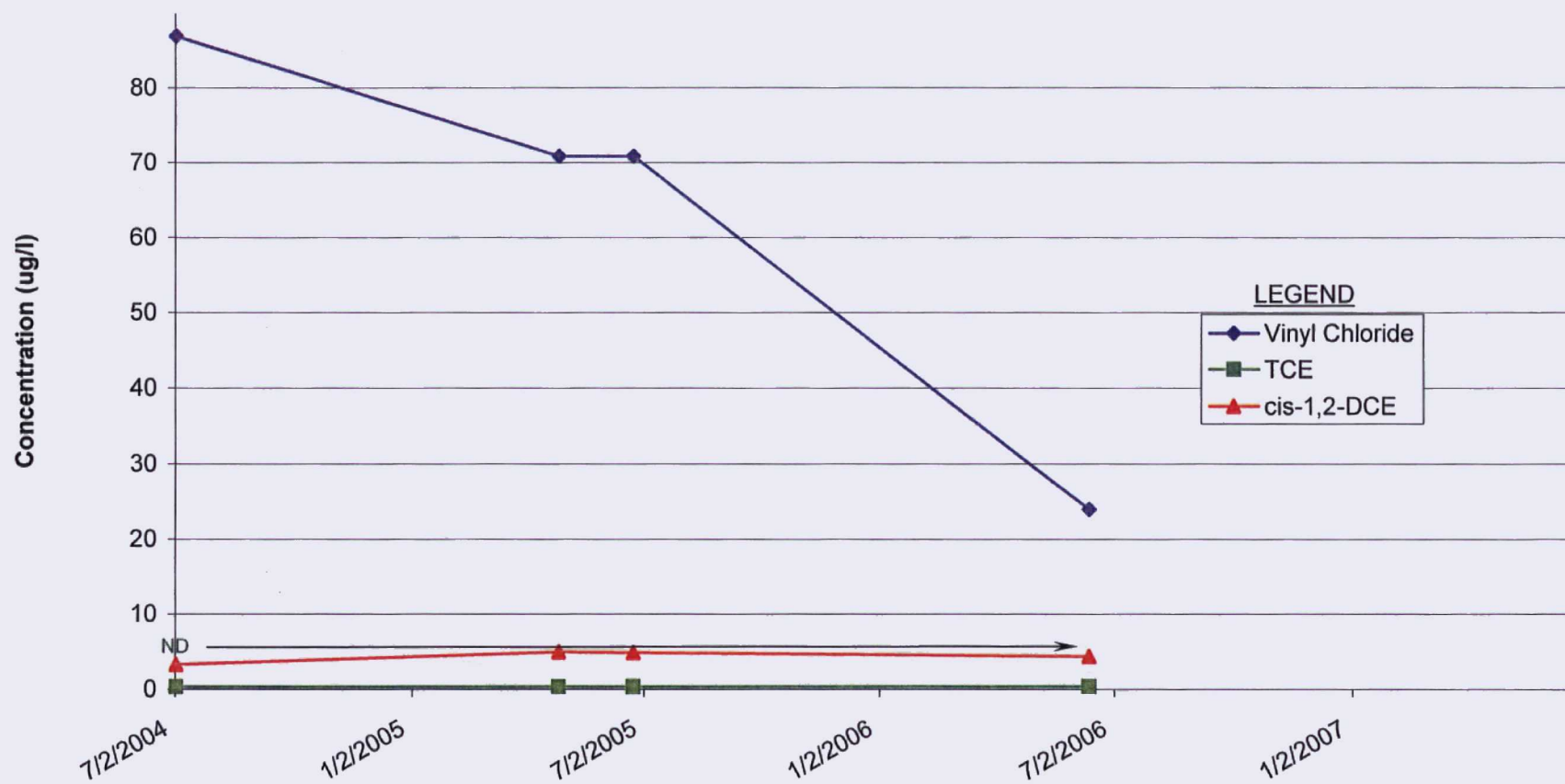


FIGURE 25
PW-7
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan

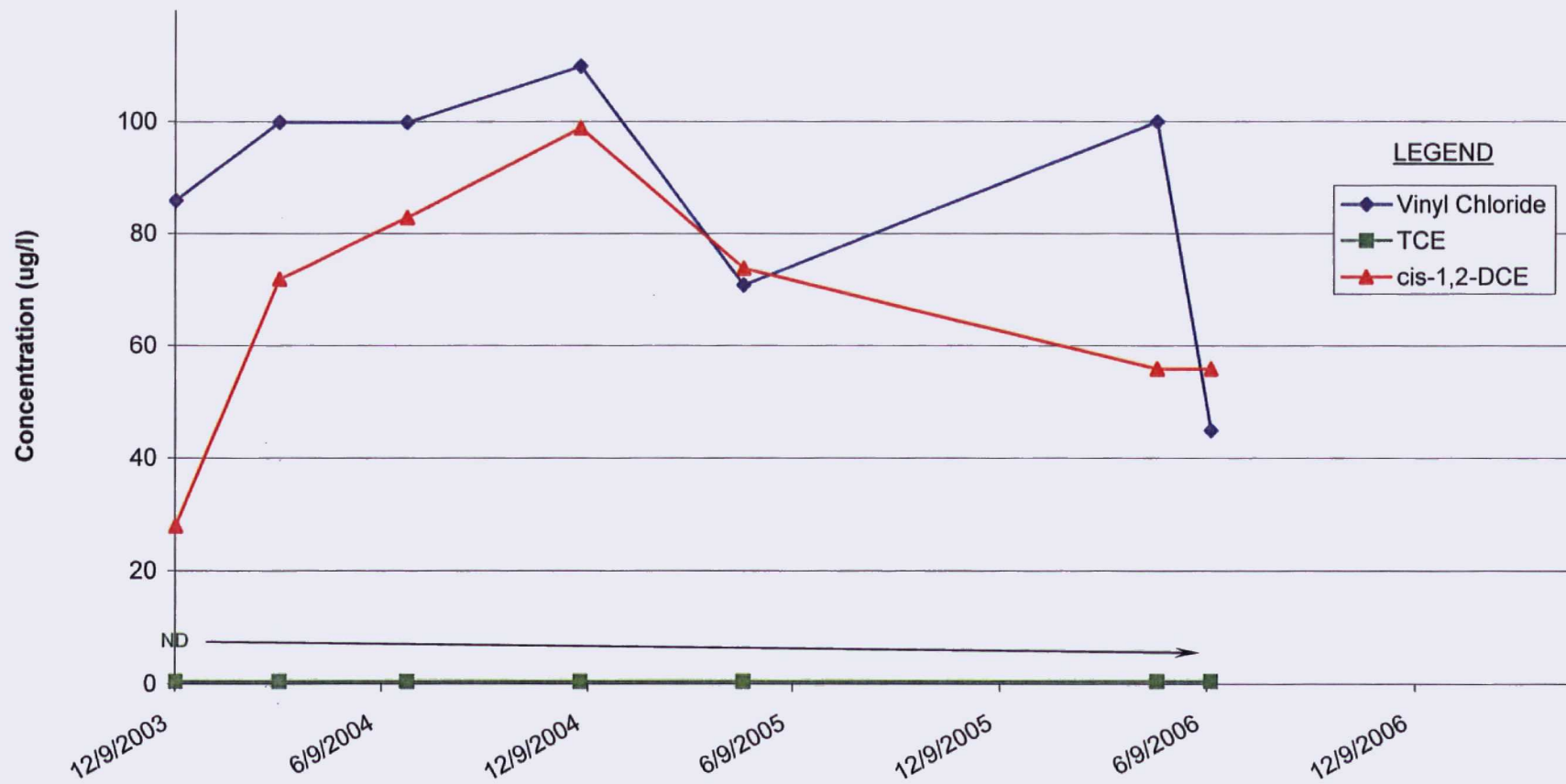


FIGURE 26
PW-8
VC, TCE, and cis-1,2-DCE Concentrations Over Time
June 2006 Annual Monitoring Event
Rose Township Site
Holly, Michigan

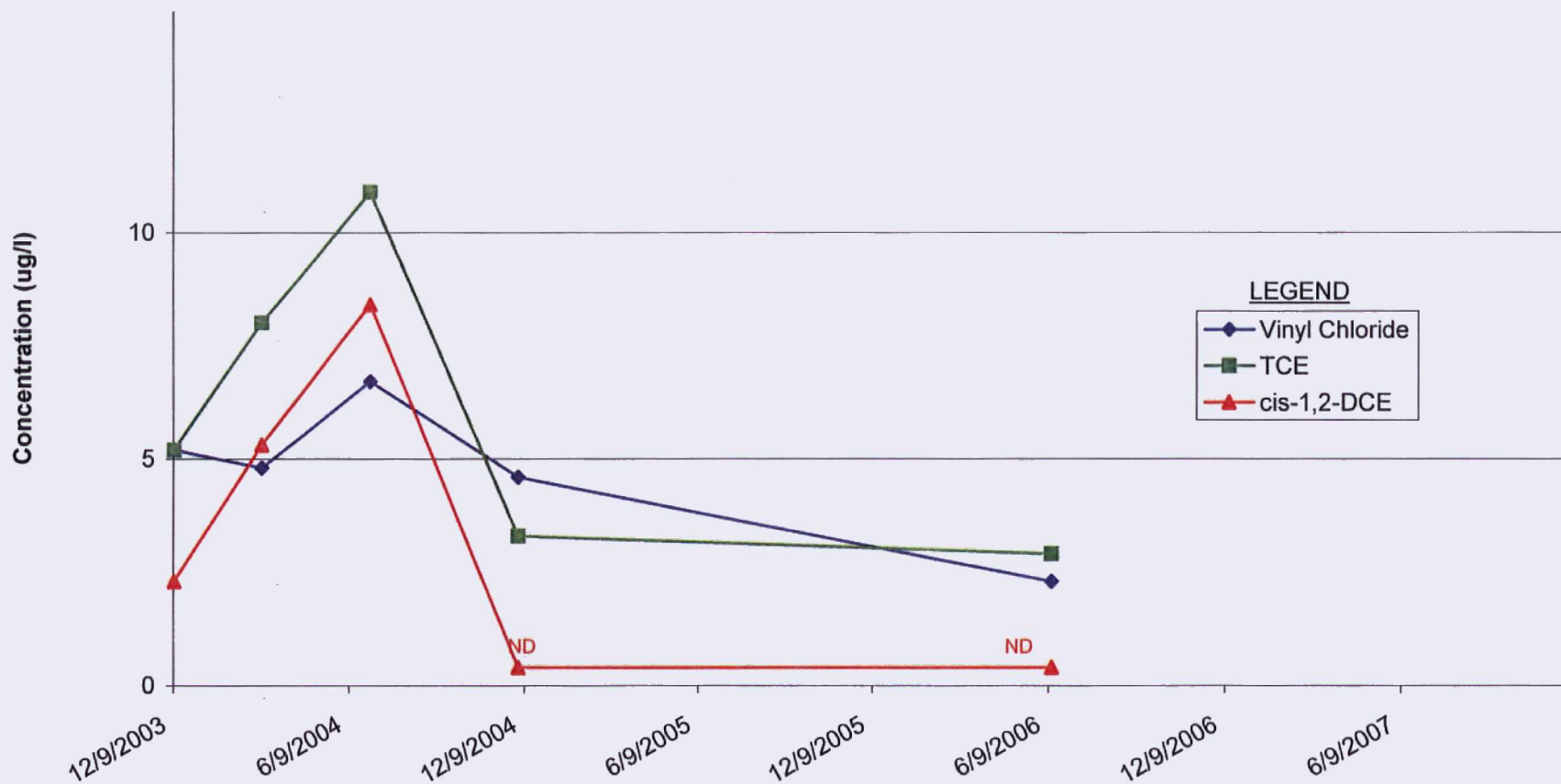


Table 1
Summary of Groundwater Level Elevations
Rose Township Demode Road Site
Holly, Michigan

Well ID	Northing	Easting	Op of Casing Elevation (ft. AMSL)	Ground Surface (ft. BTOC)	Ground Surface Elevation (ft. AMSL)	Screened Interval		Screen Length (feet)	Screened Interval		Total Depth (ft. BGS)	Total Depth (ft. AMSL)	Flowing Well	June-06	
						Screen Minimum Depth (ft. BGS)	Screen Maximum Depth (ft. BGS)		Screen Minimum Depth (ft. AMSL)	Screen Maximum Depth (ft. AMSL)				Water Level Measurement (ft. ATOC)	Head Elevation (ft. AMSL)
DNR-1	444677.19	13319829.47	1000.65	-3.35	1004.00	51.0	53.0	2.0	953.0	951.0	53.0	951.0	Yes	2.25	1002.90
DNR-2	444939.57	13319748.08	997.33	-3.27	1000.60	93.0	95.0	2.0	907.8	905.6	95.0	905.6	Yes	5.76	1003.09
DNR-3	445688.24	13320139.49	996.92	-5.48	1002.40	82.0	84.0	2.0	920.4	918.4	84.0	918.4	Yes		NM
DNR-4S	447532.39	13320808.49	981.20	2.50	978.70	48.0	53.0	5.0	930.7	925.7	53.0	925.7	Yes	12.75	993.95
DNR-4I	447532.60	13320802.39	981.33	2.00	979.33	79.0	84.0	5.0	900.3	895.3	84.0	895.3	Yes	12.98	984.31
DNR-4D	447539.01	13320810.89	978.50	-0.60	979.10	116.0	118.0	2.0	863.1	861.1	118.0	861.1	Yes	13.56	992.06
DNR-5	446988.03	13320380.71	998.14	-3.56	1001.70	97.0	99.0	2.0	904.7	902.7	99.0	902.7	Yes		NM @
DNR-6	446826.83	13320695.53	996.58	4.02	992.58	68.0	70.0	2.0	924.6	922.6	70.0	922.6	Yes		NM @
DNR-7	446708.57	13320500.96	1031.85	-0.35	1032.20	79.0	81.0	2.0	953.2	951.2	81.0	951.2	No	-34.14	997.71
GW-1S	447405.64	13320473.72	980.33	2.63	977.70	NA	NA	NA	NA	NA	NA	NA	Yes		NA ↑
GW-1I	447402.39	13320468.56	979.91	3.00	978.91	91.0	96.0	5.0	885.9	880.9	96.0	880.9	Yes	11.27	991.18
GW-1D	447418.34	13320470.01	980.48	2.75	977.73	122.0	127.0	5.0	855.7	850.7	127.0	850.7	Yes	14.96	995.44
GW-2	446973.75	13320794.04	981.34	3.00	978.34	40.5	45.5	5.0	937.8	932.8	45.5	932.8	Yes		NA #
GW-3S	446734.78	13320830.55	990.87	3.00	987.87	62.0	67.0	5.0	925.9	920.9	67.0	920.9	Yes		NA ↑
GW-3I	446734.78	13320830.55	991.13	2.50	988.63	79.5	84.5	5.0	909.1	904.1	84.5	904.1	Yes	5.90	997.03
GW-3D	446734.78	13320830.55	990.60	2.00	988.60	98.0	103.0	5.0	890.6	885.6	103.0	885.6	Yes	6.43	997.03
GW-4S	447577.83	13321047.35	978.23	2.67	975.56	58.0	63.0	5.0	917.8	912.6	63.0	912.6	Yes		NA ↑
GW-4I	447574.64	13321040.42	977.35	2.75	974.60	85.0	90.0	5.0	889.8	884.6	90.0	884.6	Yes	15.67	993.02
GW-4D	447574.24	13321030.39	977.27	2.87	974.60	109.0	114.0	5.0	885.6	880.6	114.0	880.6	Yes	15.65	992.92
GW-5S	446928.46	13320739.18	983.89	1.50	982.39	52.0	57.0	5.0	930.4	925.4	57.0	925.4	Yes	2.36	986.25
GW-5I	446933.48	13320734.82	984.53	1.96	982.57	70.0	75.0	5.0	912.6	907.6	75.0	907.6	Yes	9.66	994.19
GW-5D	446932.99	13320740.73	984.66	2.38	982.28	90.5	95.5	5.0	891.8	886.8	95.5	886.8	Yes	5.55	990.21
GW-6S	447038.22	13320589.52	982.42	1.42	981.00	54.0	59.0	5.0	927.0	922.0	59.0	922.0	Yes		NA #
GW-6I	447048.60	13320585.72	982.43	2.54	979.89	73.0	78.0	5.0	906.9	901.9	78.0	901.9	Yes	13.16	995.59
GW-6D	447043.97	13320590.86	982.09	2.25	979.84	92.0	97.0	5.0	887.8	882.8	97.0	882.8	Yes	13.51	995.60
GW-7S	446806.97	13320309.59	1025.20	2.88	1022.32	24.0	29.0	5.0	998.3	993.3	29.0	993.3	No	-24.11	1001.09
GW-7I	446802.93	13320309.59	1025.24	2.29	1022.95	69.5	74.5	5.0	953.5	948.5	74.5	948.5	No	-27.19	998.05
GW-8S	446703.98	13320502.98	1031.99	2.33	1029.66	36.0	41.0	5.0	993.7	988.7	41.0	988.7	No	-33.05	998.94
GW-8I	446379.76	13320544.39	1038.33	2.42	1035.91	35.5	40.5	5.0	1000.4	995.4	40.5	995.4	No	-36.70	1001.83
GW-10S	447114.16	13320396.37	989.70	2.46	987.24	75.0	80.0	5.0	912.2	907.2	80.0	907.2	Yes	4.36	994.06
GW-10I	447122.52	13320399.72	989.58	2.71	986.87	98.0	103.0	5.0	888.9	883.9	103.0	883.9	Yes	6.92	996.50
GW-10D	447119.84	13320403.80	989.50	2.83	986.67	120.0	125.0	5.0	866.7	861.7	125.0	861.7	Yes	7.49	996.99
GW-11S	446409.53	13320733.82	1030.19	2.50	1027.69	46.5	51.5	5.0	981.2	976.2	51.5	976.2	No	-30.61	999.58
GW-11I	446402.35	13320728.06	1030.29	2.46	1027.83	135.0	140.0	5.0	892.8	887.8	140.0	887.8	No	-30.66	999.63
GW-11D	446404.83	13320734.18	1030.05	2.54	1027.51	183.0	188.0	5.0	844.5	839.5	188.0	839.5	No	-25.63	1004.42
GW-12S	446013.89	13320755.24	1031.12	2.83	1028.29	65.5	70.5	5.0	962.8	957.8	70.5	957.8	No	-30.11	1001.01
GW-12I	445897.47	13320748.12	1030.52	2.88	1027.64	138.0	143.0	5.0	889.8	884.8	143.0	884.8	No	-29.68	1000.84
GW-12D	446004.63	13320753.73	1031.01	2.88	1028.13	191.0	196.0	5.0	837.1	832.1	196.0	832.1	No	-26.55	1004.46
GW-13S	446998.74	13320264.22	1009.84	2.88	1006.96	75.0	80.0	5.0	932.0	927.0	80.0	927.0	No	-12.91	996.93
GW-13I	446997.63	13320254.84	1010.12	3.13	1006.99	92.0	97.0	5.0	915.0	910.0	102.0	905.0	No	-12.01	998.11
GW-13D	446896.88	13320273.21	1009.60	2.88	1006.72	120.0	125.0	5.0	866.7	861.7	140.0	866.7	No	-11.55	998.05
GW-14	447085.90	13320445.08	990.08	3.21	988.87	176.0	181.0	5.0	810.9	805.9	240.0	746.9	Yes	7.44	997.52
GW-15	447219.87	13320274.36	985.85	2.54	983.31	98.0	103.0	5.0	865.3	860.3	103.0	860.3	Yes		NM
GW-16	444967.05	13320229.71	1016.58	2.83	1013.75	44.5	49.5	5.0	9						

Table 1

Summary of Groundwater Level Elevations

Rose Township Demode Road Site

Holly, Michigan

Page 2 of 2

Well ID	Northing	Easting	Top of Casing Elevation (ft. AMSL)	Ground Surface (ft. BTOC)	Ground Surface Elevation (ft. AMSL)	Screened Interval		Screen Length (feet)	Screened Interval		Total Depth (ft. BGS)	Total Depth (ft. AMSL)	Flowing Well	June-06	
						Screen Minimum Depth (ft. BGS)	Screen Maximum Depth (ft. BGS)		Screen Minimum Depth (ft. AMSL)	Screen Maximum Depth (ft. AMSL)				Water Level Measurement (ft. ATOC)	Head Elevation (ft. AMSL)
RW-6	444915.45	13320450.88	1026.42	2.83	1023.59	31.0	34.0	3.0	992.6	989.6	34.0	989.6	No	-24.51	1001.91
RW-6D	444915.45	13320450.88	1026.98	3.50	1023.48	66.0	69.0	3.0	957.5	954.5	69.0	954.5	No	-25.05	1001.93
RW-7	445120.68	13320242.82	1022.74	2.63	1020.11	13.5	18.5	5.0	1006.6	1001.6	18.5	1001.6	No	-21.07	1001.67
RW-8	445233.79	13320192.70	1023.06	2.75	1020.31	37.0	40.0	3.0	983.3	980.3	40.0	980.3	No	-24.43	998.63
RW-8D	445237.45	13320191.79	1022.20	1.75	1020.45	70.0	73.0	3.0	950.5	947.5	73.0	947.5	No	-25.65	996.55
RW-9	445309.05	13319941.89	999.99	2.92	997.07	11.0	14.0	3.0	986.1	983.1	14.0	983.1	No	-6.89	993.10
RW-10	445809.13	13320706.46	1023.13	3.21	1019.92	15.0	18.0	3.0	1004.9	1001.9	18.0	1001.9	No	-8.52	1014.61
RW-11	446529.54	13320346.67	1035.04	3.04	1032.00	33.0	36.0	3.0	999.0	996.0	36.0	996.0	No	-25.19	1009.85
RW-12	444963.45	13320929.00	1046.84	2.83	1044.01	44.0	47.0	3.0	1000.0	997.0	47.0	997.0	No	-44.80	1002.04
RW-13	444435.24	13320447.67	1010.77	3.00	1007.77	11.0	14.0	3.0	996.8	993.8	14.0	993.8	No	-11.45	999.32
RW-14	446202.95	13320367.44	1031.74	3.25	1028.49	30.0	33.0	3.0	998.5	995.5	33.0	995.5	No	-31.77	999.97
RW-15	445450.12	13320805.75	1051.04	3.29	1047.75	51.0	53.0	2.0	996.8	994.8	53.0	994.8	No	-49.53	1001.51
RW-16	444272.30	13319677.20	1011.43	3.50	1007.93	17.5	20.5	3.0	990.4	987.4	20.5	987.4	No	-7.65	1003.78
RW-17	445605.90	13321164.30	1016.76	2.17	1014.59	40.0	43.0	3.0	974.6	971.6	43.0	971.6	No	-12.49	1004.27
RW-18	447006.83	13319977.71	1010.76	4.33	1006.45	30.5	33.5	3.0	976.0	973.0	33.5	973.0	No	-5.39	1005.39
SG-1	447491	13321086	973.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	No	NM	
SG-2	447156	13321126	972.88	NA	NA	NA	NA	NA	NA	NA	NA	NA	No	NM	
SG-3	446666	13321828	972.88	NA	NA	NA	NA	NA	NA	NA	NA	NA	No	0.49	973.37
SG-4	448241	13322404	967.79	NA	NA	NA	NA	NA	NA	NA	NA	NA	No	1.35	969.14
SG-5	448342	13323740	967.44	NA	NA	NA	NA	NA	NA	NA	NA	NA	No	1.60	969.24
SG-6	447554	13321305	973.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	No	0.40	973.58
SG-7	448923	13320339	975.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	No	NM	
SG-8	448508	13321050	973.73	NA	NA	NA	NA	NA	NA	NA	NA	NA	No	0.35	974.08
SG-9	443006	13320693	989.51	NA	NA	NA	NA	NA	NA	NA	NA	NA	No	1.46	990.97
SG-10	447173	13320742	972.83	NA	NA	NA	NA	NA	NA	NA	NA	NA	No	NM	
PZ-1	444993	13320456	1028.44	NA	NA	14.0	24.0	10.0	NA	NA	NA	NA	No	-20.54	1007.90
PZ-2	447600	13321556	962.74	NA	NA	3.5	13.5	10.0	NA	NA	NA	NA	No	-7.49	975.25
PZ-3	447195	13321900	992.35	NA	NA	14.0	24.0	10.0	NA	NA	NA	NA	No	NM	
PZ-4	447589	13322236	1010.26	NA	NA	13.0	23.0	10.0	NA	NA	NA	NA	No	-26.20	984.06
PZ-5	446623	13322002	983.73	NA	NA	0.0	10.0	10.0	NA	NA	NA	NA	No	-3.86	979.85
WPZ-1	445600	13319964	993.47	NA	NA	0.0	5.0	5.0	NA	NA	NA	NA	No	NM	
WPZ-2	446616	13319932	991.37	NA	NA	0.0	5.0	5.0	NA	NA	NA	NA	No	NM	
WPZ-3	446089	13321194	965.87	NA	NA	0.0	5.0	5.0	NA	NA	NA	NA	No	NM	
Tipsico La	NA	NA	1012.72	NA	NA	NA	NA	NA	NA	NA	NA	NA	No	NM	

NA = Not Available
 NM = Not Measured
 † Casing diameter prevents measurement
 @ Insufficient flow into well
 # Well is not screened in the aquifer
 ** Pumping equipment prevents water level measurement

Table 2
Summary of VOC Analytical Results in Groundwater Samples
Rose Township Demode Road Site
Holly, Michigan
Samples Collected June 12 through 21, 2008
Earth Tech Project No. 89861.02.04

Volatile Organic Compound	ROD Target Cleanup Levels ^A		2004 Federal Drinking Water Maximum Contaminant Levels in µg/L	MDEQ Part 201 Generic Cleanup Criteria Concentration in µg/L			Sample Location Identification Concentration in µg/L																					
	Phase I Target Concentration Limits in µg/L	Phase II Target Concentration Limits in µg/L		Residential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Groundwater Contact Criteria	DNR-1	DNR-3	DNR-4D	DNR-5	DNR-6	DNR-7	GW-3I	GW-11	GW-4D	GW-5I	GW-5D	GW-6I	GW-6D	GW-12I	GW-12D	GW-16	GW-17D	GW-17I	GW-18	GW-19D	GW-19S	GW-20D
Benzene	1.5	0.133	5	5	200	11,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Chlorobenzene	80	60	100	100	47	66,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Chloroethane	—	—	—	430	ID	440,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	12	ND (1.0)	ND (1.0)	ND (1.0)	2.6	4	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	3.2	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethane	—	—	—	680	740	2,400,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	6.7	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
cis-1,2-Dichloroethene	—	—	70	70	620	200,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
trans-1,2-Dichloroethene	—	—	100	100	1500	220,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	28	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Ethylbenzene	680	680	700	74	18	170,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Tetrahydrofuran	—	—	—	95	11,000	1,600,000	ND (10)	ND (1.0)	ND (10)	ND (10)	ND (10)	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Toluene	—	—	1,000	790	140	530,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Trichloroethene	1.5	0.627	5	5	200	22,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1,1-Trichloroethane	—	—	200	200	200	1,300,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vinyl Chloride	1	0.003	2	2	15	1,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Xylenes (Total)	440	440	10	280	35	190,000	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)

Notes:
ROD -Record of Decision, EPA September 30, 1987
A -Phase I and Phase II TCLs as identified in the Remedial Design and Remedial Action Work Plan (Fred C. Hart Associates, Inc., et al, September 18, 1989).
MDEQ -Michigan Department of Environmental Quality
ID -Inadequate data for MDEQ to develop criterion.
ND (1.0) -Not detected above the analytical method reporting limits. The analytical method reporting limits are included in parenthesis.
µg/L -Micrograms per liter
— -No standard available
ND (1.0) -Indicates an exceedance of one or more criteria (ROD Target Cleanup Levels, MCLs, MDEQ Part 201)

Table 2
Summary of VOC Analytical Results in Groundwater Samples
Rose Township Demode Road Site
Holly, Michigan
Samples Collected June 12 through 21, 2006
Earth Tech Project No. 89861.02.04

Volatile Organic Compound	ROD Target Cleanup Levels ^A		2004 Federal Drinking Water Maximum Contaminant Levels in µg/L	MDEQ Part 201 Generic Cleanup Criteria Concentration in µg/L			Sample Location Identification Concentration in µg/L																					
	Phase I Target Concentration Limits in µg/L	Phase II Target Concentration Limits in µg/L		Residential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Groundwater Contact Criteria	GW-20I	GW-21D	GW-21S	GW-22D	GW-22I	GW-22S	GW-23D	GW-23I	GW-23S	GW-24D	GW-24I	GW-25D	GW-25I	GW-26D	GW-26I	MW-2I	MW-102D	MW103S	MW-107I	MW-108D	MW-109D	MW-3I
Benzene	1.5	0.133	5	5	200	11,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Chlorobenzene	60	60	100	100	47	88,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Chloroethane	—	—	—	430	ID	440,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	8.9	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethane	—	—	—	880	740	2,400,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	9.8	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
cis-1,2-Dichloroethene	—	—	70	70	820	200,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	2.1	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
trans-1,2-Dichloroethene	—	—	100	100	1500	220,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Ethylbenzene	880	880	700	74	18	170,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Tetrahydrofuran	—	—	—	95	11,000	1,600,000	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Toluene	—	—	1,000	790	140	530,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	1.1	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Trichloroethene	1.5	0.627	5	5	200	22,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1,1-Trichloroethane	—	—	200	200	200	1,300,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vinyl Chloride	1	0.003	2	2	15	1,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Xylenes (Total)	440	440	10	280	35	190,000	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)

Notes:
ROD -Record of Decision, EPA September 30, 1987
A -Phase I and Phase II TCLs as identified in the Remedial Design and Remedial Action Work Plan (Fred C. Hart Associates, Inc., et al, Septemb
MDEQ -Michigan Department of Environmental Quality
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Table 2
Summary of VOC Analytical Results in Groundwater Samples
Rose Township Demode Road Site
Holly, Michigan
Samples Collected June 12 through 21, 2006
Earth Tech Project No. 89861.02.04

Volatile Organic Compound	ROD Target Cleanup Levels ^A		2004 Federal Drinking Water Maximum Contaminant Levels in µg/L	MDEQ Part 201 Generic Cleanup Criteria Concentration in µg/L			Sample Location Identification Concentration in µg/L											
	Phase I Target Concentration Limits in µg/L	Phase II Target Concentration Limits in µg/L		Residential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Groundwater Contact Criteria	PW-1	PW-3	PW-4	PW-6	PW-7	PW-8	PW-9	RW-1	RW-1D	RW-2	RW-5S	RW-17
Benzene	1.5	0.133	5	5	200	11,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Chlorobenzene	60	60	100	100	47	86,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	1.1	ND (1.0)	27	ND (1.0)
Chloroethane	—	—	—	430	ID	440,000	2.0	ND (1.0)	ND (1.0)	ND (1.0)	2.3	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethane	—	—	—	880	740	2,400,000	1.1	1.3	ND (1.0)	ND (1.0)	4.4	ND (1.0)	ND (1.0)	4.3	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
cis-1,2-Dichloroethene	—	—	70	70	620	200,000	19	ND (1.0)	ND (1.0)	4.5	56	ND (1.0)	ND (1.0)	5.4	18	ND (1.0)	ND (1.0)	ND (1.0)
trans-1,2-Dichloroethene	—	—	100	100	1500	220,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	23	ND (1.0)	ND (1.0)	ND (1.0)	29	ND (1.0)	ND (1.0)	ND (1.0)
Ethylbenzene	680	680	700	74	18	170,000	ND (1.0)	24	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	5.5	ND (1.0)
Tetrahydrofuran	—	—	—	95	11,000	1,600,000	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Toluene	—	—	1,000	790	140	530,000	ND (1.0)	28	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Trichloroethene	1.5	0.627	5	5	200	22,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	3.0	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1,1-Trichloroethane	—	—	200	200	200	1,300,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	5.3	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vinyl Chloride	1	0.003	2	2	15	1,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	2.1	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Xylenes (Total)	440	440	10	280	35	190,000	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)

Notes:
ROD -Record of Decision, EPA September 30, 1987
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[illegible]

Table 2
Summary of Microbial VOC Analytical Results
Rose Township Domestic Road Site
Holly, Michigan

Vep#	Vep#	TCE	DCE	DBP	DBP	Parameters										Parameters										DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP	DBP
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Holly, Michigan
Samples Collected June 12 through 21, 2008
Earth Tech Project No. 88861.02.04

* The detected above analytical method reporting limits. The analytical method reporting limits are listed in parentheses.

	U.S.	NTU	µMm	mg/L	Microgram per liter	Microgram per liter	C ⁺ -Organic Carbon	mV	Pd8	NA	*
Electrical Conductivity Scale											Not available.
Turbidity Scatter Index											Fishwater turbidity index. Results may not be accurate.

Samples Collected June 12 through 21, 2008
Earth Tech Project No. 88861.02.04

•	Underwater electronic tagging	Feasible, may not be
MA	Not available	
PS8	Functional Depth Scales	
mv	Method	
C ²	Designs Catalog	
ppL	Microgram per liter	
mg/L	Microgram per milliliter	
ppbm	Microgramme per cubic meter	
MTU	Micrograms to analytical units	
B.U.	Standard units	
MD (1.0)	Not detected above analytical method report	
Index		

Table 4
Summary of Biogeochemical and Field Parameters in Groundwater Samples
Rose Township Demode Road Site
Holly, Michigan
Samples Collected June 12 through 21, 2008
Earth Tech Project No. 89881.02.04

Biogeochemical and Field Parameters	Units	Units													
		MW-31	PW-1	PW-3	PW-4	PW-5	PW7	PW8	PW-9	RW-1	RW-17	RW-1D	RW-2	RW-58	
pH	S.U.	7.88	7.88	7.88	7.83	7.60	7.83	7.33	7.83	7.93	7.72	7.85	7.42	7.88	
Conductivity	µS/cm	448	575	621	597	597	576	678	491	590	641	523	501	487	
Dissolved Oxygen	mg/L	0.41	4.88	2.49	2.16	4.49	4.88	4.22	8.85	1.09	0.23	0.37	0.27	0.30	
Temperature	C°	10.91	10.87	10.89	10.92	10.79	11.04	13.80	11.17	12.04	11.07	11.82	12.31	11.88	
Oxidation/Reduction Potential	mv	-121	164	93	104	168	213	391	116	294	59	199	-86	-138	
Salinity	PSS	NA	0.28	0.30	0.29	0.29	0.28	0.33	NA	0.28	0.31	0.23	NA	NA	
Turbidity	NTU	14.3	1.24	0.63	0.65	0.49	1.83	6.76	2.93	0.60	2.16	0.42	2.60	18.9	
Sulfide	mg/L	NA	NA	NA	NA	NA	0.00	0.00	NA	NA	NA	0.00	NA	0.00	
Dissolved Iron	mg/L	NA	NA	NA	NA	NA	2.08	1.79	NA	NA	NA	0.06	NA	3.08	
Dissolved Manganese	mg/L	NA	NA	NA	NA	NA	0.10	0.70	NA	NA	NA	0.00	NA	5.30	
Biogeochemical Parameters															
Nitrogen, Ammonia	mg/L	NA	NA	NA	NA	NA	0.14	0.15	NA	NA	0.070	NA	NA	NA (0.05)	
Total Organic Carbon	mg/L	NA	NA	NA	NA	NA	1.7	1.5	NA	NA	1.9	NA	NA	1.1	
Nitrogen, Nitrate	mg/L	NA	NA	NA	NA	NA	ND (0.05)	0.18	NA	NA	ND (0.05)	NA	NA	ND (0.05)	
Nitrogen, Nitrite	mg/L	NA	NA	NA	NA	NA	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	NA	NA	ND (0.05)	
Sulfate	mg/L	NA	NA	NA	NA	NA	8.9	17	NA	NA	ND (5.0)	NA	NA	21	
Chloride	mg/L	NA	NA	NA	NA	NA	4.6	9.5	NA	NA	2.0	NA	NA	5.4	
Total Alkalinity	mg/L	NA	NA	NA	NA	NA	300	340	NA	NA	290	NA	NA	310	
Dissolved Gases															
Ethane Gas in Water	µg/L	NA	NA	NA	NA	NA	ND (4.0)	ND (1.0)	NA	NA	ND (5.0)	NA	NA	ND (1.0)	
Ethane Gas in Water	µg/L	NA	NA	NA	NA	NA	6.8	ND (1.0)	NA	NA	ND (5.0)	NA	NA	ND (1.0)	
Methane Gas in Water	µg/L	NA	NA	NA	NA	NA	93	2.8	NA	NA	190	NA	NA	0.71	

Notes:
 ND (S.O) -Not detected above analytical method reports
 S.U. -Standard units
 NTU -Nephelometric turbidity units
 µS/cm -MicroSiemens per centimeter
 mg/L -Milligram per liter
 µg/L -Microgram per liter
 C° -Degrees Celsius
 mv -Millivolt
 PSS -Practical Salinity Scale
 NA -Not available.
 * Turbidity meter batteries failing. Result may not be

Table 5
Summary of Analytical Influent and Effluent Data
Rose Township, Demode Road Site
Groundwater Extraction System
Units as Given

Sampling Month: Sample Date:		Discharge Limitations	July Data 07/01/05 07/01/05		July Data 07/06/05 07/06/05		July Data 07/14/05 07/14/05		July Data 07/21/05 07/21/05		July Data 07/28/05 07/28/05		July Monthly Average Effluent
Site Identification:		See footnote	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	
Compound Name	Units												
Chlorobenzene	ug/L	5(m)	-	<1	-	-	-	-	-	-	-	-	-
Methylene chloride	ug/L	5(m)	-	<1	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	ug/L	5(m)	-	<1	-	-	-	-	-	-	-	-	-
Trichloroethene	ug/L	5(m)	-	<1	-	-	-	-	-	-	-	-	-
Vinyl chloride	ug/L	3(m)	30	<1	38	<1	18	<1	17	<1	32	<1	<1
Benzene	ug/L	5(m)	<1	<1	-	-	-	-	-	-	-	-	-
Toluene	ug/L	5(m)	<1	<1	-	-	-	-	-	-	-	-	-
1,2-Dichloroethene	ug/L	NA	6.6	<1	<10	<2	8.7	<2	5.9	<2	3.5	<2	<2
PCB: aroclor 1016	ug/L	*	<1	<1	-	-	-	-	-	-	-	-	-
PCB: aroclor 1221	ug/L	*	<1	<1	-	-	-	-	-	-	-	-	-
PCB: aroclor 1232	ug/L	*	<1	<1	-	-	-	-	-	-	-	-	-
PCB: aroclor 1242	ug/L	*	<1	<1	-	-	-	-	-	-	-	-	-
PCB: aroclor 1248	ug/L	*	<1	<1	-	-	-	-	-	-	-	-	-
PCB: aroclor 1254	ug/L	*	<1	<1	-	-	-	-	-	-	-	-	-
PCB: aroclor 1260	ug/L	*	<1	<1	-	-	-	-	-	-	-	-	-
Arsenic, total	ug/L	50(a)	-	6.7	-	6.8	-	6.7	-	3.2	-	6.5	6.6
Bis(2-ethyl hexyl)phthalate	ug/L	5(m)	-	<5	-	<5	-	<5	-	<5	-	<5	<5
Isophorone	ug/L	5(m)	-	<6	-	-	-	-	-	-	-	-	-
Lead, total	ug/L	14(a)	-	<1	-	<1	-	<1	-	<1	-	<1	<1
Naphthalene	ug/L	5(m)	-	<5	-	-	-	-	-	-	-	-	-
Pentachlorophenol	ug/L	0.8(a)	-	<1	-	-	-	-	-	-	-	-	-
Air Emission Rate	lbs/hr	1.0 †	1.4595		0.0032		0.0003		0.0003		0.0021		

-- = Not Analyzed

* = Discharge limitation is 0.00002 ug/L for total PCB's.

† = The air emission discharge limitation of 3.0 pounds per hour includes the emissions from the soil vapor extraction system.

(a) = Monthly Average

(m) = Daily Average

7.6 = Analyte above method detection limits (MDL)

SD = Serial dilution was not required for this sample because the analyte concentration was below 100 times MDL.

Table 8
Summary of Analytical Influent and Effluent Data
Rose Township, Demode Road Site
Groundwater Extraction System
Units as Given

Sampling Month: Sample Date:		Discharge Limitations	October Data 10/06/05 10/08/05		October Data 10/13/05 10/13/05		October Data 10/20/05 10/20/05		October Data 10/26/05 10/26/05		October Monthly Average Effluent
Site Identification:		See footnote	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	
Compound Name	Units										
Chlorobenzene	ug/L	5(m)	-	<1	-	-	-	-	-	-	-
Methylene chloride	ug/L	5(m)	-	<1	-	-	-	-	-	-	-
1,1,1-Trichloroethane	ug/L	5(m)	-	<1	-	-	-	-	-	-	-
Trichloroethene	ug/L	5(m)	-	<1	-	-	-	-	-	-	-
Vinyl chloride	ug/L	3(m)	6.8	<1	30	<1	36	<1	34	<1	<1
Benzene	ug/L	5(m)	<1	<1	-	-	-	-	-	-	-
Toluene	ug/L	5(m)	<1	<1	-	-	-	-	-	-	-
1,2-Dichloroethene	ug/L	NA	4.6	<1	6.4	<2	7.7	<2	7.5	<2	<2
PCB: aroclor 1016	ug/L	*	<1	SR<1.1	-	-	-	-	-	-	-
PCB: aroclor 1221	ug/L	*	<1	SR<1.1	-	-	-	-	-	-	-
PCB: aroclor 1232	ug/L	*	<1	SR<1.1	-	-	-	-	-	-	-
PCB: aroclor 1242	ug/L	*	<1	SR<1.1	-	-	-	-	-	-	-
PCB: aroclor 1248	ug/L	*	<1	SR<1.1	-	-	-	-	-	-	-
PCB: aroclor 1254	ug/L	*	<1	SR<1.1	-	-	-	-	-	-	-
PCB: aroclor 1260	ug/L	*	<1	SR<1.1	-	-	-	-	-	-	-
Arsenic, total	ug/L	50(a)	-	6.8	-	11	-	SD 6.1	-	7.2	7.5
Bis(2-ethyl hexyl)phthalate	ug/L	5(m)	-	<5	-	<5	-	<5	-	<5	<5
Isophorone	ug/L	5(m)	-	<5	-	-	-	-	-	-	-
Lead, total	ug/L	14(a)	-	<1	-	<1	-	<1	-	<1	<1
Naphthalene	ug/L	5(m)	-	<5	-	-	-	-	-	-	-
Pentachlorophenol	ug/L	0.8(a)	-	<1	-	-	-	-	-	-	-
Air Emission Rate	lbs/hr	1.0 †	0.0007		0.0036		0.0043		0.0039		

- = Not Analyzed

* = Discharge limitation is 0.00002 ug/L for total PCB's.

† = The air emission discharge limitation of 3.0 pounds per hour includes the emissions from the soil vapor extraction system.

(a) = Monthly Average

(m) = Daily Average

7.5 = Analyte above method detection limits (MDL)

SD = Serial dilution was not required for this sample because the analyte concentration was below 100 times MDL.

Table 5
Summary of Analytical Influent and Effluent Data
Rose Township, Demode Road Site
Groundwater Extraction System
Units as Given

Sampling Month: Sample Date:		Discharge Limitations	November Data 11/02/05		November Data 11/09/05		November Monthly Average Effluent
Site Identification:		See footnote	Influent	Effluent	Influent	Effluent	
Compound Name	Units						
Chlorobenzene	ug/L	5(m)	-	-	-	-	-
Methylene chloride	ug/L	5(m)	-	-	-	-	-
1,1,1-Trichloroethane	ug/L	5(m)	-	-	-	-	-
Trichloroethene	ug/L	5(m)	-	-	-	-	-
Vinyl chloride	ug/L	3(m)	27	<1	34	<1	<1
Benzene	ug/L	5(m)	-	-	-	-	-
Toluene	ug/L	5(m)	-	-	-	-	-
1,2-Dichloroethene	ug/L	NA	7.5	<2	8.2	<2	<2
PCB: aroclor 1016	ug/L	*	-	-	-	-	-
PCB: aroclor 1221	ug/L	*	-	-	-	-	-
PCB: aroclor 1232	ug/L	*	-	-	-	-	-
PCB: aroclor 1242	ug/L	*	-	-	-	-	-
PCB: aroclor 1248	ug/L	*	-	-	-	-	-
PCB: aroclor 1254	ug/L	*	-	-	-	-	-
PCB: aroclor 1260	ug/L	*	-	-	-	-	-
Arsenic, total	ug/L	50(a)	-	SD 3.4	-	SD 8	8.7
Bis(2-ethyl hexyl)phthalate	ug/L	5(m)	-	<0.5	-	<5	<5
Isophorone	ug/L	5(m)	-	-	-	-	-
Lead, total	ug/L	14(a)	-	<1	-	<1	<1
Naphthalene	ug/L	5(m)	-	-	-	-	-
Pentachlorophenol	ug/L	0.8(a)	-	<0.5	-	-	-
Air Emission Rate	lbs/hr	1.0 †	0.0025		0.0035		

-- = Not Analyzed

* = Discharge limitation is 0.00002 ug/L for total PCB's.

† = The air emission discharge limitation of 3.0 pounds per hour includes the emissions from the soil vapor extraction system.

(a) = Monthly Average

(m) = Daily Average

7.5 = Analyte above method detection limits (MDL)

SD = Serial dilution was not required for this sample because the analyte concentration was below 100 times MDL.

Table 5
Summary of Analytical Influent and Effluent Data
Rose Township, Demode Road Site
Groundwater Extraction System
Units as Given

Sampling Month: Sample Date:		Discharge Limitations	December Data 12/21/05		December Data 12/28/05		December Monthly Average Effluent
Site Identification:		See footnote	Influent	Effluent	Influent	Effluent	
Compound Name	Units						
Chlorobenzene	ug/L	5(m)	-	-	-	-	-
Methylene chloride	ug/L	5(m)	-	-	-	-	-
1,1,1-Trichloroethane	ug/L	5(m)	-	-	-	-	-
Trichloroethene	ug/L	5(m)	-	-	-	-	-
Vinyl chloride	ug/L	3(m)	38	<1	31	<1	<1
Benzene	ug/L	5(m)	-	-	-	-	-
Toluene	ug/L	5(m)	-	-	-	-	-
1,2-Dichloroethene	ug/L	NA	6.4	<2	7.9	<2	<2
PCB: aroclor 1016	ug/L	*	-	-	-	-	-
PCB: aroclor 1221	ug/L	*	-	-	-	-	-
PCB: aroclor 1232	ug/L	*	-	-	-	-	-
PCB: aroclor 1242	ug/L	*	-	-	-	-	-
PCB: aroclor 1248	ug/L	*	-	-	-	-	-
PCB: aroclor 1254	ug/L	*	-	-	-	-	-
PCB: aroclor 1260	ug/L	*	-	-	-	-	-
Arsenic, total	ug/L	50(a)	-	5.5	-	SD 6.4	6.0
Bis(2-ethyl hexyl)phthalate	ug/L	5(m)	-	<5	-	<5	<5
Isophorone	ug/L	5(m)	-	-	-	-	-
Lead, total	ug/L	14(a)	-	<1	-	<1	<1
Naphthalene	ug/L	5(m)	-	-	-	-	-
Pentachlorophenol	ug/L	0.8(a)	-	<5	-	-	-
Air Emission Rate	lbs/hr	1.0 †	0.0015		0.0041		

-- = Not Analyzed

* = Discharge limitation is 0.00002 ug/L for total PCB's.

† = The air emission discharge limitation of 3.0 pounds per hour includes the emissions from the soil vapor extraction system.

(a) = Monthly Average

(m) = Daily Average

7.5 = Analyte above method detection limits (MDL)

SD = Serial dilution was not required for this sample because the analyte concentration was below 100 times MDL.

Table 5
Summary of Analytical Influent and Effluent Data
Rose Township, Demode Road Site
Groundwater Extraction System
Units as Given

Sampling Month: Sample Date:		Discharge Limitations	January Data 01/05/06 01/05/06		January Data 01/11/06 01/11/06		January Data 01/19/06 01/19/06		January Data 01/26/06 01/26/06		January Monthly Average Effluent
Site Identification:		See footnote	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	
Compound Name	Units										
Chlorobenzene	ug/L	5(m)	-	-	-	-	-	-	-	<1	-
Methylene chloride	ug/L	5(m)	-	-	-	-	-	-	-	<1	-
1,1,1-Trichloroethane	ug/L	5(m)	-	-	-	-	-	-	-	<1	-
Trichloroethene	ug/L	5(m)	-	-	-	-	-	-	-	<1	-
Vinyl chloride	ug/L	3(m)	37	<1	38	<1	36	<1	20	<1	<1
Benzene	ug/L	5(m)	-	-	-	-	-	-	<1	<1	-
Toluene	ug/L	5(m)	-	-	-	-	-	-	<1	<1	-
1,2-Dichloroethene	ug/L	NA	7.8	<2	8.2	<2	9.4	<2	7.8	<1	<2
PCB: aroclor 1016	ug/L	*	-	-	-	-	-	-	<1	<1	-
PCB: aroclor 1221	ug/L	*	-	-	-	-	-	-	<1	<1	-
PCB: aroclor 1232	ug/L	*	-	-	-	-	-	-	<1	<1	-
PCB: aroclor 1242	ug/L	*	-	-	-	-	-	-	<1	<1	-
PCB: aroclor 1248	ug/L	*	-	-	-	-	-	-	<1	<1	-
PCB: aroclor 1254	ug/L	*	-	-	-	-	-	-	<1	<1	-
PCB: aroclor 1260	ug/L	*	-	-	-	-	-	-	<1	<1	-
Arsenic, total	ug/L	50(a)	-	6.6	-	6.3	-	SD 3.7	-	4.6	5.3
Bis(2-ethyl hexyl)phthalate	ug/L	5(m)	-	<5	-	<5	-	<5	-	<5	<5
Isophorone	ug/L	5(m)	-	-	-	-	-	-	-	<5	<5
Lead, total	ug/L	14(a)	-	<1	-	<1	-	<1	-	<1	<1
Naphthalene	ug/L	5(m)	-	-	-	-	-	-	-	<5	<5
Pentachlorophenol	ug/L	0.8(a)	-	<0.5	-	-	-	-	-	<0.5	<0.5
Air Emission Rate	lbs/hr	1.0 †	0.0046		0.0052		0.0034		0.0015		

-- = Not Analyzed

* = Discharge limitation is 0.00002 ug/L for
total PCB's.

† = The air emission discharge limitation of 3.0
pounds per hour includes the emissions
from the soil vapor extraction system.

(a) = Monthly Average

(m) = Daily Average

7.5 = Analyte above method detection limits
(MDL)

SD = Serial dilution was not required for this
sample because the analyte concentration was
below 100 times MDL.

Table 5
Summary of Analytical Influent and Effluent Data
Rose Township, Demode Road Site
Groundwater Extraction System
Units as Given

Sampling Month: Sample Date:		Discharge Limitations	February Data 02/02/06 02/02/06		February Data 02/09/06 02/09/06		February Data 02/13/06 02/13/06		February Data 02/21/06 02/21/06		February Monthly Average Effluent
Site Identification:		See footnote	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	
Compound Name	Units										
Chlorobenzene	ug/L	5(m)	-	-	-	-	-	-	-	-	-
Methylene chloride	ug/L	5(m)	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	ug/L	5(m)	-	-	-	-	-	-	-	-	-
Trichloroethene	ug/L	5(m)	-	-	-	-	-	-	-	-	-
Vinyl chloride	ug/L	3(m)	42	<1	39	<1	39	<1	32	<1	<1
Benzene	ug/L	5(m)	-	-	-	-	-	-	-	-	-
Toluene	ug/L	5(m)	-	-	-	-	-	-	-	-	-
1,2-Dichloroethene	ug/L	NA	5.5	<2	8.1	<2	8.7	<2	7.6	<2	<2
PCB: aroclor 1016	ug/L	*	-	-	-	-	-	-	-	-	-
PCB: aroclor 1221	ug/L	*	-	-	-	-	-	-	-	-	-
PCB: aroclor 1232	ug/L	*	-	-	-	-	-	-	-	-	-
PCB: aroclor 1242	ug/L	*	-	-	-	-	-	-	-	-	-
PCB: aroclor 1248	ug/L	*	-	-	-	-	-	-	-	-	-
PCB: aroclor 1254	ug/L	*	-	-	-	-	-	-	-	-	-
PCB: aroclor 1260	ug/L	*	-	-	-	-	-	-	-	-	-
Arsenic, total	ug/L	50(a)	-	6	-	SD 4.6	-	5.4	-	5.9	5.6
Bis(2-ethyl hexyl)phthalate	ug/L	5(m)	-	<0.5	-	<5.2	-	<5	-	<5	<5
Isophorone	ug/L	5(m)	-	-	-	-	-	-	-	-	-
Lead, total	ug/L	14(a)	-	<1	-	<1	-	<1	-	<1	<1
Naphthalene	ug/L	5(m)	-	-	-	-	-	-	-	-	-
Pentachlorophenol	ug/L	0.8(a)	-	<0.5	-	-	-	-	-	-	<0.5
Air Emission Rate	lbs/hr	1.0 †	0.0058		0.0029		0.0052		0.0044		

-- = Not Analyzed

* = Discharge limitation is 0.00002 ug/L for
total PCB's.

† = The air emission discharge limitation of 3.0
pounds per hour includes the emissions
from the soil vapor extraction system.

(a) = Monthly Average

(m) = Daily Average

7.5 = Analyte above method detection limits
(MDL)

SD = Serial dilution was not required for this
sample because the analyte concentration was
below 100 times MDL.

Table 5
Summary of Analytical Influent and Effluent Data
Rose Township, Demode Road Site
Groundwater Extraction System
Units as Given

Sampling Month: Sample Date:		Discharge Limitations	March Data 03/01/06		March Data 03/01/06		March Data 03/08/06		March Data 03/08/06		March Data 3/16/206		March Data 3/16/206		March Data 03/23/06		March Data 03/23/06		March Data 03/28/06		March Data 03/28/06		March Monthly Average Effluent
Site Identification:		See footnote	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	
Compound Name	Units																						
Chlorobenzene	ug/L	5(m)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	ug/L	5(m)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	ug/L	5(m)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	ug/L	5(m)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	ug/L	3(m)	36	<1	36	<1	36	<1	34	<1	34	<1	34	<1	34	<1	34	<1	34	<1	34	<1	<1
Benzene	ug/L	5(m)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	ug/L	5(m)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethene	ug/L	NA	7.7	<2	8.4	<2	9.1	<2	10	<2	11	<2	11	<2	11	<2	11	<2	11	<2	11	<2	<2
PCB: aroclor 1016	ug/L	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PCB: aroclor 1221	ug/L	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PCB: aroclor 1232	ug/L	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PCB: aroclor 1242	ug/L	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PCB: aroclor 1248	ug/L	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PCB: aroclor 1254	ug/L	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PCB: aroclor 1260	ug/L	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic, total	ug/L	50(a)	-	SD 6.7	-	6.9	-	7.7	-	7.9	-	7.7	-	7.9	-	7.7	-	7.9	-	7.7	-	7.4	7.4
Bis(2-ethyl hexyl)phthalate	ug/L	5(m)	-	<0.5	-	<5	-	<5	-	<5	-	<5	-	<5	-	<5	-	<5	-	<5	-	<5	<5
Isophorone	ug/L	5(m)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead, total	ug/L	14(a)	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	<1
Naphthalene	ug/L	5(m)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	ug/L	0.8(a)	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
Air Emission Rate	lbs/hr	1.0 †	0.0206		0.0048		0.0047		0.0048		0.0041												

– = Not Analyzed

* = Discharge limitation is 0.00002 ug/L for total PCB's.

† = The air emission discharge limitation of 3.0 pounds per hour includes the emissions from the soil vapor extraction system.

(a) = Monthly Average

(m) = Daily Average

7.5 = Analyte above method detection limits (MDL)

SD = Serial dilution was not required for this sample because the analyte concentration was below 100 times MDL.

Table 5
Summary of Analytical Influent and Effluent Data
Rose Township, Demode Road Site
Groundwater Extraction System
Units as Given

Sampling Month: Sample Date:		Discharge Limitations	April Data 04/02/06 04/02/06		April Data 04/10/06 04/10/06		April Data 04/17/06 04/17/06		April Data 04/25/06 04/25/06		April Monthly Average Effluent
Site Identification:		See footnote	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	
Compound Name	Units										
Chlorobenzene	ug/L	5(m)	-	<1	-	-	-	-	-	-	<1
Methylene chloride	ug/L	5(m)	-	<1	-	-	-	-	-	-	<1
1,1,1-Trichloroethane	ug/L	5(m)	-	<1	-	-	-	-	-	-	<1
Trichloroethene	ug/L	5(m)	-	<1	-	-	-	-	-	-	<1
Vinyl chloride	ug/L	3(m)	21	<1	38	<1	39	<1	28	<1	<1
Benzene	ug/L	5(m)	<1	<1	-	-	-	-	-	-	<1
Toluene	ug/L	5(m)	<1	<1	-	-	-	-	-	-	<1
1,2-Dichloroethene	ug/L	NA	10	<1	12	<2	13	<2	32	<2	<2
PCB: aroclor 1016	ug/L	*	<1	<1	-	-	-	-	-	-	<1
PCB: aroclor 1221	ug/L	*	<1	<1	-	-	-	-	-	-	<1
PCB: aroclor 1232	ug/L	*	<1	<1	-	-	-	-	-	-	<1
PCB: aroclor 1242	ug/L	*	<1	<1	-	-	-	-	-	-	<1
PCB: aroclor 1248	ug/L	*	<1	<1	-	-	-	-	-	-	<1
PCB: aroclor 1254	ug/L	*	<1	<1	-	-	-	-	-	-	<1
PCB: aroclor 1260	ug/L	*	<1	<1	-	-	-	-	-	-	<1
Arsenic, total	ug/L	50(a)	-	7.7	-	7.3	-	SD 5.4	-	4.8	6.3
Bis(2-ethyl hexyl)phthalate	ug/L	5(m)	-	<5	-	<5	-	<5	-	<5	<5
Isophorone	ug/L	5(m)	-	<5	-	-	-	-	-	-	<5
Lead, total	ug/L	14(a)	-	<1	-	<1	-	<1	-	<1	<1
Naphthalene	ug/L	5(m)	-	<5	-	-	-	-	-	-	<5
Pentachlorophenol	ug/L	0.8(a)	-	<0.5	-	-	-	-	-	<0.5	<0.5
Air Emission Rate	lbs/hr	1.0 †	0.0029		0.0049		0.0045		0.0024		

-- = Not Analyzed

* = Discharge limitation is 0.00002 ug/L for total PCB's.

† = The air emission discharge limitation of 3.0 pounds per hour includes the emissions from the soil vapor extraction system.

(a) = Monthly Average

(m) = Daily Average

7.5 = Analyte above method detection limits (MDL)

SD = Serial dilution was not required for this sample because the analyte concentration was below 100 times MDL.

Table 5
Summary of Analytical Influent and Effluent Data
Rose Township, Demode Road Site
Groundwater Extraction System
Units as Given

Sampling Month: Sample Date:		Discharge Limitations	May Data 05/01/06 05/01/06		May Data 05/08/06 05/08/06		May Data 05/15/06 05/15/06		May Data 05/22/06 05/22/06		May Data 05/30/06 05/30/06		May Monthly Average Effluent
Site Identification:		See footnote	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	
Compound Name	Units												
Chlorobenzene	ug/L	5(m)	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	ug/L	5(m)	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	ug/L	5(m)	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	ug/L	5(m)	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	ug/L	3(m)	28	<1	21	<1	17	<1	18	<1	32	<1	<1
Benzene	ug/L	5(m)	-	-	-	-	-	-	-	-	-	-	-
Toluene	ug/L	5(m)	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	ug/L	NA	10	<2	10	<2	28	<2	28	<2	11	<2	<2
PCB: aroclor 1016	ug/L	*	-	-	-	-	-	-	-	-	-	-	-
PCB: aroclor 1221	ug/L	*	-	-	-	-	-	-	-	-	-	-	-
PCB: aroclor 1232	ug/L	*	-	-	-	-	-	-	-	-	-	-	-
PCB: aroclor 1242	ug/L	*	-	-	-	-	-	-	-	-	-	-	-
PCB: aroclor 1248	ug/L	*	-	-	-	-	-	-	-	-	-	-	-
PCB: aroclor 1254	ug/L	*	-	-	-	-	-	-	-	-	-	-	-
PCB: aroclor 1260	ug/L	*	-	-	-	-	-	-	-	-	-	-	-
Arsenic, total	ug/L	50(a)	-	SD 4.4	-	SD 6.8	-	6.8	-	7.5	-	6.2	6.3
Bis(2-ethyl hexyl)phthalate	ug/L	5(m)	-	<5	-	<5	-	<5	-	<5	-	<0.5	<5
Isophorone	ug/L	5(m)	-	-	-	-	-	-	-	-	-	-	-
Lead, total	ug/L	14(a)	-	<1	-	<1	-	<1	-	<1	-	<1	<1
Naphthalene	ug/L	5(m)	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	ug/L	0.8(a)	-	<0.5	-	-	-	-	-	-	-	<0.5	<0.5
Air Emission Rate	lbs/hr	1.0 †	0.0029		0.0047		0.0024		0.0043		0.0164		

- = Not Analyzed

* = Discharge limitation is 0.00002 ug/L for total PCB's.

† = The air emission discharge limitation of 3.0 pounds per hour includes the emissions from the soil vapor extraction system.

(a) = Monthly Average

(m) = Daily Average

7.5 = Analyte above method detection limits

(MDL)

SD = Serial dilution was not required for this sample because the analyte concentration was below 100 times MDL.

Table 6
Summary of Analytical Influent and Effluent Data
Rose Township, Demode Road Site
Groundwater Extraction System
Units as Given

Sampling Month: Sample Date:		Discharge Limitations	June Data 06/05/06 06/05/06		June Data 06/12/06 06/12/06		June Data 06/19/06 06/19/06		June Data 06/25/06 06/25/06		June Monthly Average Effluent
Site Identification:		See footnote	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	
Compound Name	Units										
Chlorobenzene	ug/L	5(m)	-	<1	-	-	-	-	-	-	<1
Methylene chloride	ug/L	5(m)	-	<1	-	-	-	-	-	-	<1
1,1,1-Trichloroethane	ug/L	5(m)	-	<1	-	-	-	-	-	-	<1
Trichloroethene	ug/L	5(m)	-	<1	-	-	-	-	-	-	<1
Vinyl chloride	ug/L	3(m)	31	<1	34	<1	35	<1	38	<1	<1
Benzene	ug/L	5(m)	<1	<1	-	-	-	-	-	-	<1
Toluene	ug/L	5(m)	<1	<1	-	-	-	-	-	-	<1
1,2-Dichloroethene	ug/L	NA	10	<1	12	<2	11	<2	12	<2	<2
PCB: aroclor 1016	ug/L	*	<1	<1	-	-	-	-	-	-	<1
PCB: aroclor 1221	ug/L	*	<1	<1	-	-	-	-	-	-	<1
PCB: aroclor 1232	ug/L	*	<1	<1	-	-	-	-	-	-	<1
PCB: aroclor 1242	ug/L	*	<1	<1	-	-	-	-	-	-	<1
PCB: aroclor 1248	ug/L	*	<1	<1	-	-	-	-	-	-	<1
PCB: aroclor 1254	ug/L	*	<1	<1	-	-	-	-	-	-	<1
PCB: aroclor 1260	ug/L	*	<1	<1	-	-	-	-	-	-	<1
Arsenic, total	ug/L	50(a)	-	SD 6.4	-	6.6	-	SD 8.8	-	9	7.7
Bis(2-ethyl hexyl)phthala	ug/L	5(m)	-	<5	-	<5	-	<5	-	<5	<5
Isophorone	ug/L	5(m)	-	<5	-	-	-	-	-	-	<5
Lead, total	ug/L	14(a)	-	<1	-	<1	-	<1	-	<1	<1
Naphthalene	ug/L	5(m)	-	<5	-	-	-	-	-	-	<5
Pentachlorophenol	ug/L	0.8(a)	-	<0.5	-	-	-	-	-	-	<0.5
Air Emission Rate	lbs/hr	1.0 †	0.0048		0.0053		0.0051		0.0034		

- = Not Analyzed

* = Discharge limitation is 0.00002 ug/L for
total PCB's.

† = The air emission discharge limitation of 3.0
pounds per hour includes the emissions
from the soil vapor extraction system.

(a) = Monthly Average

(m) = Daily Average

7.5 = Analyte above method detection limits
(MDL)

SD = Serial dilution was not required for this
sample because the analyte concentration was
below 100 times MDL.

Table 6
Summary of Removal Rate and Mass Removed
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	Daily Mass Removal Rate (lbs/hour)	Cumulative Mass Removed (lbs)
07/01/05	0.0018	401.81
07/02/05	0.0018	401.85
07/03/05	0.0018	401.89
07/04/05	0.0018	401.94
07/05/05	0.0018	401.98
07/06/05	0.0032	402.06
07/07/05	0.0032	402.13
07/08/05	0.0032	402.21
07/09/05	0.0032	402.29
07/10/05	0.0032	402.36
07/11/05	0.0032	402.44
07/12/05	0.0032	402.52
07/13/05	0.0032	402.60
07/14/05	0.0003	402.60
07/15/05	0.0003	402.61
07/16/05	0.0003	402.62
07/17/05	0.0003	402.62
07/18/05	0.0003	402.63
07/19/05	0.0003	402.64
07/20/05	0.0003	402.65
07/21/05	0.0003	402.65
07/22/05	0.0003	402.66
07/23/05	0.0003	402.67
07/24/05	0.0003	402.67
07/25/05	0.0003	402.68
07/26/05	0.0003	402.69
07/27/05	0.0003	402.70
07/28/05	0.0021	402.75
07/29/05	0.0021	402.80
07/30/05	0.0021	402.85
07/31/05	0.0021	402.90

Note: Daily Mass Removal Rates are estimated based on groundwater influent and effluent analytical and flow data.

Table 6
Summary of Removal Rate and Mass Removed
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	Daily Mass Removal Rate (lbs/hour)	Cumulative Mass Removed (lbs)
08/01/05	0.0000	402.90
08/02/05	0.0000	402.90
08/03/05	0.0000	402.90
08/04/05	0.0000	402.90
08/05/05	0.0000	402.90
08/06/05	0.0000	402.90
08/07/05	0.0000	402.90
08/08/05	0.0000	402.90
08/09/05	0.0000	402.90
08/10/05	0.0000	402.90
08/11/05	0.0000	402.90
08/12/05	0.0000	402.90
08/13/05	0.0000	402.90
08/14/05	0.0000	402.90
08/15/05	0.0000	402.90
08/16/05	0.0000	402.90
08/17/05	0.0000	402.90
08/18/05	0.0000	402.90
08/19/05	0.0000	402.90
08/20/05	0.0000	402.90
08/21/05	0.0000	402.90
08/22/05	0.0000	402.90
08/23/05	0.0000	402.90
08/24/05	0.0000	402.90
08/25/05	0.0000	402.90
08/26/05	0.0000	402.90
08/27/05	0.0000	402.90
08/28/05	0.0000	402.90
08/29/05	0.0000	402.90
08/30/05	0.0000	402.90
08/31/05	0.0000	402.90

Note: Daily Mass Removal Rates are estimated based on groundwater influent and effluent analytical and flow data.

Table 6
Summary of Removal Rate and Mass Removed
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	Daily Mass Removal Rate (lbs/hour)	Cumulative Mass Removed (lbs)
09/01/05	0.0000	402.90
09/02/05	0.0000	402.90
09/03/05	0.0000	402.90
09/04/05	0.0000	402.90
09/05/05	0.0000	402.90
09/06/05	0.0000	402.90
09/07/05	0.0000	402.90
09/08/05	0.0000	402.90
09/09/05	0.0000	402.90
09/10/05	0.0000	402.90
09/11/05	0.0000	402.90
09/12/05	0.0000	402.90
09/13/05	0.0000	402.90
09/14/05	0.0000	402.90
09/15/05	0.0000	402.90
09/16/05	0.0000	402.90
09/17/05	0.0000	402.90
09/18/05	0.0000	402.90
09/19/05	0.0000	402.90
09/20/05	0.0000	402.90
09/21/05	0.0000	402.90
09/22/05	0.0000	402.90
09/23/05	0.0000	402.90
09/24/05	0.0000	402.90
09/25/05	0.0000	402.90
09/26/05	0.0000	402.90
09/27/05	0.0000	402.90
09/28/05	0.0000	402.90
09/29/05	0.0000	402.90
09/30/05	0.0000	402.90

Note: Daily Mass Removal Rates are estimated based on groundwater influent and effluent analytical and flow data.

Table 6
Summary of Removal Rate and Mass Removed
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	Daily Mass Removal Rate (lbs/hour)	Cumulative Mass Removed (lbs)
10/01/05	0.0021	402.95
10/02/05	0.0021	403.00
10/03/05	0.0021	403.05
10/04/05	0.0021	403.10
10/05/05	0.0021	403.15
10/06/05	0.0007	403.17
10/07/05	0.0007	403.18
10/08/05	0.0007	403.20
10/09/05	0.0007	403.22
10/10/05	0.0007	403.23
10/11/05	0.0007	403.25
10/12/05	0.0007	403.27
10/13/05	0.0036	403.35
10/14/05	0.0036	403.44
10/15/05	0.0036	403.53
10/16/05	0.0036	403.61
10/17/05	0.0036	403.70
10/18/05	0.0036	403.79
10/19/05	0.0036	403.87
10/20/05	0.0043	403.98
10/21/05	0.0043	404.08
10/22/05	0.0043	404.18
10/23/05	0.0043	404.28
10/24/05	0.0043	404.39
10/25/05	0.0043	404.49
10/26/05	0.0039	404.58
10/27/05	0.0039	404.68
10/28/05	0.0039	404.77
10/29/05	0.0039	404.87
10/30/05	0.0039	404.96
10/31/05	0.0039	405.05

Note: Daily Mass Removal Rates are estimated based on groundwater influent and effluent analytical and flow data.

Table 6
Summary of Removal Rate and Mass Removed
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	Daily Mass Removal Rate (lbs/hour)	Cumulative Mass Removed (lbs)
11/01/05	0.0039	405.15
11/02/05	0.0025	405.21
11/03/05	0.0025	405.27
11/04/05	0.0025	405.33
11/05/05	0.0025	405.39
11/06/05	0.0025	405.45
11/07/05	0.0025	405.51
11/08/05	0.0025	405.57
11/09/05	0.0035	405.65
11/10/05	0.0035	405.73
11/11/05	0.0035	405.82
11/12/05	0.0035	405.90
11/13/05	0.0035	405.99
11/14/05	0.0035	406.07
11/15/05	0.0035	406.15
11/16/05	0.0000	406.15
11/17/05	0.0000	406.15
11/18/05	0.0000	406.15
11/19/05	0.0000	406.15
11/20/05	0.0000	406.15
11/21/05	0.0000	406.15
11/22/05	0.0000	406.15
11/23/05	0.0000	406.15
11/24/05	0.0000	406.15
11/25/05	0.0000	406.15
11/26/05	0.0000	406.15
11/27/05	0.0000	406.15
11/28/05	0.0000	406.15
11/29/05	0.0000	406.15
11/30/05	0.0000	406.15

Note: Daily Mass Removal Rates are estimated based on groundwater influent and effluent analytical and flow data.

Table 6
Summary of Removal Rate and Mass Removed
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	Daily Mass Removal Rate (lbs/hour)	Cumulative Mass Removed (lbs)
12/01/05	0.0000	406.15
12/02/05	0.0000	406.15
12/03/05	0.0000	406.15
12/04/05	0.0000	406.15
12/05/05	0.0000	406.15
12/06/05	0.0000	406.15
12/07/05	0.0000	406.15
12/08/05	0.0000	406.15
12/09/05	0.0000	406.15
12/10/05	0.0000	406.15
12/11/05	0.0000	406.15
12/12/05	0.0000	406.15
12/13/05	0.0000	406.15
12/14/05	0.0000	406.15
12/15/05	0.0000	406.15
12/16/05	0.0000	406.15
12/17/05	0.0000	406.15
12/18/05	0.0000	406.15
12/19/05	0.0000	406.15
12/20/05	0.0000	406.15
12/21/05	0.0015	406.19
12/22/05	0.0015	406.23
12/23/05	0.0015	406.26
12/24/05	0.0015	406.30
12/25/05	0.0015	406.33
12/26/05	0.0015	406.37
12/27/05	0.0015	406.41
12/28/05	0.0041	406.50
12/29/05	0.0041	406.60
12/30/05	0.0041	406.70
12/31/05	0.0041	406.80

Note: Daily Mass Removal Rates are estimated based on groundwater influent and effluent analytical and flow data.

Table 6
Summary of Removal Rate and Mass Removed
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	Daily Mass Removal Rate (lbs/hour)	Cumulative Mass Removed (lbs)
01/01/06	0.0041	406.90
01/02/06	0.0041	407.00
01/03/06	0.0041	407.10
01/04/06	0.0041	407.19
01/05/06	0.0046	407.30
01/06/06	0.0046	407.41
01/07/06	0.0046	407.52
01/08/06	0.0046	407.64
01/09/06	0.0046	407.75
01/10/06	0.0046	407.86
01/11/06	0.0052	407.98
01/12/06	0.0052	408.11
01/13/06	0.0052	408.23
01/14/06	0.0052	408.36
01/15/06	0.0052	408.48
01/16/06	0.0052	408.60
01/17/06	0.0052	408.73
01/18/06	0.0052	408.85
01/19/06	0.0034	408.94
01/20/06	0.0034	409.02
01/21/06	0.0034	409.10
01/22/06	0.0034	409.18
01/23/06	0.0034	409.26
01/24/06	0.0034	409.34
01/25/06	0.0034	409.43
01/26/06	0.0015	409.46
01/27/06	0.0015	409.50
01/28/06	0.0015	409.53
01/29/06	0.0015	409.57
01/30/06	0.0015	409.61
01/31/06	0.0015	409.64

Note: Daily Mass Removal Rates are estimated based on groundwater influent and effluent analytical and flow data.

Table 6
Summary of Removal Rate and Mass Removed
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	Daily Mass Removal Rate (lbs/hour)	Cumulative Mass Removed (lbs)
02/01/06	0.0015	409.68
02/02/06	0.0058	409.82
02/03/06	0.0058	409.96
02/04/06	0.0058	410.10
02/05/06	0.0058	410.23
02/06/06	0.0058	410.37
02/07/06	0.0058	410.51
02/08/06	0.0058	410.65
02/09/06	0.0029	410.72
02/10/06	0.0029	410.79
02/11/06	0.0029	410.86
02/12/06	0.0029	410.93
02/13/06	0.0052	411.06
02/14/06	0.0052	411.18
02/15/06	0.0052	411.30
02/16/06	0.0052	411.43
02/17/06	0.0052	411.55
02/18/06	0.0052	411.68
02/19/06	0.0052	411.80
02/20/06	0.0052	411.93
02/21/06	0.0044	412.03
02/22/06	0.0044	412.14
02/23/06	0.0044	412.25
02/24/06	0.0044	412.35
02/25/06	0.0044	412.46
02/26/06	0.0044	412.56
02/27/06	0.0044	412.67
02/28/06	0.0044	412.77

Note: Daily Mass Removal Rates are estimated based on groundwater influent and effluent analytical and flow data.

Table 6
Summary of Removal Rate and Mass Removed
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	Daily Mass Removal Rate (lbs/hour)	Cumulative Mass Removed (lbs)
03/01/06	0.0048	412.89
03/02/06	0.0048	413.00
03/03/06	0.0048	413.12
03/04/06	0.0048	413.23
03/05/06	0.0048	413.35
03/06/06	0.0048	413.46
03/07/06	0.0048	413.58
03/08/06	0.0048	413.70
03/09/06	0.0048	413.81
03/10/06	0.0048	413.93
03/11/06	0.0048	414.04
03/12/06	0.0048	414.16
03/13/06	0.0048	414.27
03/14/06	0.0048	414.39
03/15/06	0.0048	414.50
03/16/06	0.0047	414.61
03/17/06	0.0047	414.73
03/18/06	0.0047	414.84
03/19/06	0.0047	414.95
03/20/06	0.0047	415.07
03/21/06	0.0047	415.18
03/22/06	0.0047	415.29
03/23/06	0.0046	415.40
03/24/06	0.0046	415.51
03/25/06	0.0046	415.62
03/26/06	0.0041	415.72
03/27/06	0.0041	415.82
03/28/06	0.0041	415.92
03/29/06	0.0041	416.02
03/30/06	0.0041	416.11
03/31/06	0.0041	416.21

Note: Daily Mass Removal Rates are estimated based on groundwater influent and effluent analytical and flow data.

Table 6
Summary of Removal Rate and Mass Removed
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	Daily Mass Removal Rate (lbs/hour)	Cumulative Mass Removed (lbs)
04/01/06	0.0041	416.31
04/02/06	0.0029	416.38
04/03/06	0.0029	416.45
04/04/06	0.0029	416.52
04/05/06	0.0029	416.59
04/06/06	0.0029	416.66
04/07/06	0.0029	416.73
04/08/06	0.0029	416.80
04/09/06	0.0029	416.87
04/10/06	0.0049	416.99
04/11/06	0.0049	417.10
04/12/06	0.0049	417.22
04/13/06	0.0049	417.34
04/14/06	0.0049	417.46
04/15/06	0.0049	417.57
04/16/06	0.0049	417.69
04/17/06	0.0045	417.80
04/18/06	0.0045	417.91
04/19/06	0.0045	418.02
04/20/06	0.0045	418.12
04/21/06	0.0045	418.23
04/22/06	0.0045	418.34
04/23/06	0.0045	418.45
04/24/06	0.0045	418.56
04/25/06	0.0024	418.61
04/26/06	0.0024	418.67
04/27/06	0.0024	418.73
04/28/06	0.0024	418.79
04/29/06	0.0024	418.84
04/30/06	0.0024	418.90

Note: Daily Mass Removal Rates are estimated based on groundwater influent and effluent analytical and flow data.

Table 6
Summary of Removal Rate and Mass Removed
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	Daily Mass Removal Rate (lbs/hour)	Cumulative Mass Removed (lbs)
05/01/06	0.0029	418.97
05/02/06	0.0029	419.04
05/03/06	0.0029	419.11
05/04/06	0.0029	419.18
05/05/06	0.0029	419.25
05/06/06	0.0029	419.32
05/07/06	0.0029	419.39
05/08/06	0.0047	419.50
05/09/06	0.0047	419.61
05/10/06	0.0047	419.73
05/11/06	0.0047	419.84
05/12/06	0.0047	419.95
05/13/06	0.0047	420.06
05/14/06	0.0047	420.18
05/15/06	0.0024	420.24
05/16/06	0.0024	420.29
05/17/06	0.0024	420.35
05/18/06	0.0024	420.41
05/19/06	0.0024	420.47
05/20/06	0.0024	420.52
05/21/06	0.0024	420.58
05/22/06	0.0043	420.68
05/23/06	0.0043	420.79
05/24/06	0.0043	420.89
05/25/06	0.0043	420.99
05/26/06	0.0043	421.10
05/27/06	0.0043	421.20
05/28/06	0.0043	421.30
05/29/06	0.0043	421.41
05/30/06	0.0164	421.80
05/31/06	0.0164	422.19

Note: Daily Mass Removal Rates are estimated based on groundwater influent and effluent analytical and flow data.

Table 6
Summary of Removal Rate and Mass Removed
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	Daily Mass Removal Rate (lbs/hour)	Cumulative Mass Removed (lbs)
06/01/06	0.0164	422.59
06/02/06	0.0164	422.98
06/03/06	0.0164	423.37
06/04/06	0.0164	423.77
06/05/06	0.0048	423.88
06/06/06	0.0048	424.00
06/07/06	0.0048	424.11
06/08/06	0.0048	424.23
06/09/06	0.0048	424.34
06/10/06	0.0048	424.46
06/11/06	0.0048	424.57
06/12/06	0.0053	424.70
06/13/06	0.0053	424.83
06/14/06	0.0053	424.96
06/15/06	0.0053	425.08
06/16/06	0.0053	425.21
06/17/06	0.0053	425.34
06/18/06	0.0053	425.46
06/19/06	0.0051	425.59
06/20/06	0.0051	425.71
06/21/06	0.0051	425.83
06/22/06	0.0051	425.95
06/23/06	0.0051	426.08
06/24/06	0.0051	426.20
06/25/06	0.0034	426.28
06/26/06	0.0034	426.36
06/27/06	0.0034	426.44
06/28/06	0.0034	426.53
06/29/06	0.0034	426.61
06/30/06	0.0034	426.69

Note: Daily Mass Removal Rates are estimated based on groundwater influent and effluent analytical and flow data.

Table 7
Summary of Operational Data
Groundwater Extraction and Treatment System
Rose Township, Demode Road Site
Holly, Michigan

Date	PW-4			PW-1			PW-6			PW-7			PW-8			PW-3			Comments
	Average Flow Rate (gallons/day)	Average Hours of Operation per Day	Percent Operational	Average Flow Rate (gallons/day)	Average Hours of Operation per Day	Percent Operational	Average Flow Rate (gallons/day)	Average Hours of Operation per Day	Percent Operational	Average Flow Rate (gallons/day)	Average Hours of Operation per Day	Percent Operational	Average Flow Rate (gallons/day)	Average Hours of Operation per Day	Percent Operational	Average Flow Rate (gallons/day)	Average Hours of Operation per Day	Percent Operational	
July-05	33,710	24	100.00%	31,097	20.90	87.10%	30,065	20.90	87.10%	0	0	0.00%	0	0	0.00%	11,839	15.48	64.52%	PW-1 was temporarily out of service due to an electric short. PW-6 was out of service due to failure of booster pump. Due to the fouling of the air stripper packing media, PW-7 and PW-3 were temporarily throttled down to control flow to the air stripper. PW-8 was not operable this month due to iron fouling.
August-05	0	0	0.00%	0	0	0.00%	0	0	0.00%	0	0	0.00%	0	0	0.00%	0	0	0.00%	The groundwater treatment system was under repair following failure of the metal packing media support grate within the air stripper tower.
September-05	0	0	0.00%	0	0	0.00%	0	0	0.00%	0	0	0.00%	0	0	0.00%	0	0	0.00%	The groundwater treatment system was under repair following failure of the metal packing media support grate within the air stripper tower.
October-05	129	3.87	16.13%	76,037	24	100.00%	91,558	24	100.00%	28,401	24	100.00%	0	0	0.00%	95,604	24	100.00%	PW-4 was temporarily shut down because of repairs on the transmission line. PW-8 was not operable this month due to iron fouling.
November-05	10,257	10.84	45.16%	29,381	10.84	45.16%	31,890	10.8	45.16%	8,910	10.84	45.16%	0	0	0.00%	22,957	10.84	45.16%	PW-1, PW-3, PW-4, PW-6, and PW-7 were temporarily shut down due to failure of the blower motor. PW-8 was not operable this month due to iron fouling.
December-05	8,993	8.52	35.48%	32,675	8.52	35.48%	38,855	8.5	35.48%	13,461	8.52	35.48%	0	0	0.00%	38,438	8.52	35.48%	PW-1, PW-3, PW-4, PW-6, and PW-7 were temporarily shut down due to failure of the blower motor. PW-8 was not operable this month due to iron fouling.
January-06	47,283	24	100.00%	67,026	24	100.00%	80,593	24	100.00%	23,976	24	100.00%	0	0	0.00%	84,205	24	100.00%	PW-8 was not operable this month due to iron fouling.
February-06	51,868	24	100.00%	75,281	24	100.00%	84,219	24	100.00%	22,622	24	100.00%	0	0	0.00%	88,633	24	100.00%	PW-8 was not operable this month due to iron fouling.
March-06	54,935	24	100.00%	84,212	24	100.00%	97,698	24	100.00%	24,601	24	100.00%	0	0	0.00%	109,358	24	100.00%	PW-8 was not operable this month due to iron fouling.
April-06	20,733	19.2	80.00%	81,424	24.0	100.00%	99,629	24	100.00%	36,406	24	100.00%	8,179	16.0	66.67%	107,353	24	100.00%	PW-8 was not operable partly for this month due to high line pressure observed after cleaning. PW-4 was temporarily shut down due to minor electric problems.
May-06	65,634	24.0	100.00%	84,850	24	100.00%	71,097	17.8	74.19%	52,075	24	100.00%	38,441	24	100.00%	104,527	24.0	100.00%	PW-6 was temporarily out of service due to minor electric problems.
June-06	45,857	24	100.00%	82,742	24.0	100.00%	85,500	24	100.00%	40,006	24	100.00%	29,411	24	100.00%	81,739	24	100.00%	

Appendix A

Technical Memorandum - Extraction Well Pumping Rate Increase and Capture Zone Analysis

July 21, 2006

To: Mr. Nabil Fayoumi, United States Environmental Protection Agency

Copy: Rick Meischcsak (DaimlerChrysler), Charles Graff (MDEQ), Mary Schafer (MDEQ),

Subject: **Extraction Well Pumping Rate Increase and Capture Zone Analysis
Rose Township Demode Road Superfund Site, Holly, Michigan**

INTRODUCTION

The objective of this technical memorandum is twofold: to summarize the proposed approach for increasing the pumping rates at extraction wells PW-1, PW-4, and PW-6 to increase capture of the dissolved groundwater contaminant plume, and to present capture zone analyses of the groundwater remediation system as currently configured and at the proposed higher pumping rates. The well locations are shown on **Figure 1**.

SCHEDULE

Procurement, installation, and testing of the new pumps will be initiated subsequent to approval by the USEPA and MDEQ. It is anticipated that the new pumps can be installed and operating within approximately 4-weeks from the time of authorization.

PUMP DEPTH MODIFICATION

Currently the pumps at extraction wells PW-1 and PW-6 are placed within the screened portion of the well, and PW-4 is outfitted with a centrifugal pump with a drop tube above the screened zone. Based on July 20, 2006 discussions between Earth Tech and the MDEQ, the replacement pumps in wells PW-1, PW-4 and PW-6 will be placed approximately 5 to 10 feet above the top of the well screens. This pump placement will maximize the available screen length and minimize incrustation and corrosion of the screen associated with excess entrance velocities into the screens if the pumps were placed within the screened interval.

FIELD PROCEDURES

New submersible pumps, capable of pumping at rates of 130 gallons per minute (gpm), 60 gpm and 120 gpm, will be placed in wells PW-1, PW-4, and PW-6, respectively. Since the maximum air stripper tower capacity is 400 gpm, the pumping rates at the three upgradient extraction wells, PW-3, PW-7 and PW-8, will be adjusted to approximately 30 gpm each¹.

Prior to replacing the well pumps in PW-1, PW-4 and PW-6, a round of water levels will be collected from PW-1, PW-4, PW-5, PW-6, GW-3S, GW-3I, GW-3D, GW-5S, GW-5I, GW-5D, GW-6S, GW-6I, GW-6D, GW-8S, GW-10S, GW-10I, GW-10D, GW-17I, GW-17D, GW-18 and DNR-7 (Figure 1). In addition, pressure transducers will be placed in monitoring wells DNR-7, GW-5I, GW-18 and GW-6I to record hourly groundwater level changes during the shutdown of the old pumps and the startup of the new pumps. Water levels will be measured again from these same wells prior to starting up the new pumps.

The pumping rates for PW-1, PW-4 and PW-6 will initially be set to 130 gpm, 60 gpm and 120 gpm, respectively. These pumping rates may be adjusted at a later time, based on system performance. The water levels in the surrounding wells will be collected weekly for one month following start-up of the new pumps, to provide data for the subsequent capture zone analysis. The pressure transducers will be used to collect hourly data during the first week of pumping with the new pumps.

Groundwater levels will be collected monthly for three months from PW-1, PW-4 and PW-6 and the surrounding monitoring wells listed previously. In addition, groundwater samples will be collected monthly for three months from PW-1, PW-4 and PW-6 to evaluate changes in groundwater capture. The samples will be analyzed for VOCs (EPA Method 8260B) and will be collected using the same procedures in place for the quarterly sampling.

¹ Wells PW-3, PW-7 and PW-8 are currently pumping at approximately 72 gpm, 36 gpm, and 26 gpm, respectively.

CAPTURE ZONE ANALYSIS

A capture zone analysis was performed with the current and proposed pumping rates. The capture zone analysis was performed using the following four methods.

- Analysis of current groundwater elevations (**Figure 2**);
- Calculating groundwater flow through the cross-sectional area of the plume;
- Analytical calculations for the capture zones of the downgradient wells using the current and proposed flow rates; and
- Existing MODFLOW model using the current and proposed flow rates.

Current Groundwater Elevation Analysis

Figure 2 presents the groundwater elevation map with data collected on April 28, 2006. The six pumping wells and their pumping rates included PW-1 (59 gpm), PW-3 (72 gpm), PW-4 (45 gpm), PW-6 (71 gpm), PW-7 (36 gpm) and PW-8 (26 gpm). The groundwater contours depicted on **Figure 2** suggest that the combined pumping of the three downgradient wells (PW-1, PW-4 and PW-6) is capturing most of the plume. However, the downgradient chemical data suggests that some impacted groundwater may not be captured.

Flow-Through Cross-Sectional Area

The cross-sectional area of the plume was calculated in the vicinity of extraction well PW-6. The cross-sectional area, 36,050 ft², was calculated assuming an aquifer thickness of 103 feet and a plume width of 350 feet. The volume of groundwater flowing through this area, 225 gpm, was calculated using the cross-sectional area of the plume, 36,050 ft², the average hydraulic conductivity used in the MODFLOW model, 150 ft/day (5.3e-2 cm/s), and the average hydraulic gradient, 0.008 ft/ft (based on the groundwater potentiometric surface map of this area). The total flow, 225 gpm, is greater than the current total pumping rate of 188 gpm in the three downgradient wells, PW-1 (59 gpm), PW-4 (45 gpm) and PW-6 (71 gpm), suggesting that total groundwater capture of the plume is not occurring. However, the increased proposed pumping rate of 310 gpm in the downgradient wells, PW-1 (130 gpm), PW-4 (60 gpm) and PW-6 (120 gpm), suggests that the plume may be captured.

Analytical Capture Zone Analysis

An analytical capture zone analysis was performed with the current and proposed pumping rates using the method developed by Javandel and Tsang (1986). The method calculates the distance from the pumping well to the downgradient stagnation point, the width of the capture zone at the well and the maximum width of the capture zone upgradient of the well. The table below summarizes the values using the current and proposed pumping rates for PW-1, PW-4 and PW-6.

Purge Well	Pumping Rate (gpm)	Stagnation Point (ft)	Capture Width at Well (ft)	Capture Width Upgradient (ft)
PW-1	59 (current)	15	46	92
PW-1	130 (proposed)	32	101	202
PW-4	45 (current)	11	35	70
PW-4	60 (proposed)	15	46	92
PW-6	71 (current)	18	56	112
PW-6	120 (proposed)	30	93	187

The capture zones calculated in this manner are depicted in Figures 3 and 4. The calculated capture zones using the current pumping rates (Figure 3) do not show complete capture; however, the calculated capture zones using the proposed pumping rates (Figure 4) indicate that capture could be achieved.

MODFLOW Capture Zone Analysis

The historical MODFLOW model and associated particle tracking module MODPATH was used to calculate the capture zone using the current and proposed pumping rates. The MODFLOW model is a single layer simplification of the site hydrogeology. The model was calibrated to the measured groundwater elevations and the results indicate that complete capture of the groundwater plume is possible using the current pumping rates (Figure 5). However, the presence of downgradient groundwater impact suggests that complete capture has not occurred. Figure 6 shows the model-predicted capture zone with the proposed new pumping rates.

Capture Zone Analysis Conclusions

The various capture zone analyses indicate that limited plume capture is occurring at the current pumping rates. Additional evidence of the limited plume capture is provided by the low concentrations of vinyl chloride detected in the downgradient monitoring wells. The capture zone analyses indicate that the proposed increase in pumping rates is capable of providing complete capture of the plume. A more thorough empirical capture zone analysis will be performed after the pumping rates have been modified and the groundwater flow pattern has reestablished at steady state.

REFERENCES

Javandel, I., and C. Tsang. 1986. Capture-zone type curves: A tool for aquifer cleanup. Ground Water 24, no. 5: 616– 625.

Appendix B

Summary of Operating Flow Rates

Table B-1
Summary of Operating Flow Rates
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	PW-4		PW-1		PW-6		PW-7		PW-8		PW-3		Total
	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)
07/01/05	56,800	24	53,600	24	84,400	24	0	0	0	0	49,000	24	252,400
07/02/05	56,800	24	53,600	24	84,400	24	0	0	0	0	49,000	24	252,400
07/03/05	56,800	24	53,600	24	84,400	24	0	0	0	0	49,000	24	252,400
07/04/05	56,800	24	53,600	24	84,400	24	0	0	0	0	49,000	24	252,400
07/05/05	56,800	24	53,600	24	84,400	24	0	0	0	0	49,000	24	252,400
07/06/05	9,000	24	11,625	24	13,500	24	0	0	0	0	14,875	24	58,250
07/07/05	9,000	24	11,625	24	13,500	24	0	0	0	0	14,875	24	58,250
07/08/05	9,000	24	11,625	24	13,500	24	0	0	0	0	14,875	24	58,250
07/09/05	9,000	24	11,625	24	13,500	24	0	0	0	0	14,875	24	58,250
07/10/05	9,000	24	11,625	24	13,500	24	0	0	0	0	14,875	24	58,250
07/11/05	9,000	24	11,625	24	13,500	24	0	0	0	0	14,875	24	58,250
07/12/05	9,000	24	11,625	24	13,500	24	0	0	0	0	14,875	24	58,250
07/13/05	9,000	24	11,625	24	13,500	24	0	0	0	0	14,875	24	58,250
07/14/05	14,714	24	13,857	24	20,286	24	0	0	0	0	429	24	53,286
07/15/05	14,714	24	13,857	24	20,286	24	0	0	0	0	429	24	53,286
07/16/05	14,714	24	13,857	24	20,286	24	0	0	0	0	429	24	53,286
07/17/05	14,714	24	13,857	24	20,286	24	0	0	0	0	429	24	53,286
07/18/05	14,714	24	13,857	24	20,286	24	0	0	0	0	429	24	53,286
07/19/05	14,714	24	13,857	24	20,286	24	0	0	0	0	429	24	53,286
07/20/05	14,714	24	13,857	24	20,286	24	0	0	0	0	429	24	53,286
07/21/05	80,714	24	72,286	24	37,143	24	0	0	0	0	0	0	185,571
07/22/05	80,714	24	72,286	24	37,143	24	0	0	0	0	0	0	185,571
07/23/05	80,714	24	72,286	24	37,143	24	0	0	0	0	0	0	185,571
07/24/05	80,714	24	72,286	24	37,143	24	0	0	0	0	0	0	185,571
07/25/05	80,714	24	72,286	24	37,143	24	0	0	0	0	0	0	185,571
07/26/05	80,714	24	72,286	24	37,143	24	0	0	0	0	0	0	185,571
07/27/05	80,714	24	72,286	24	37,143	24	0	0	0	0	0	0	185,571
07/28/05	40,250	24	0	0	0	0	0	0	0	0	0	0	128,250
07/29/05	40,250	24	0	0	0	0	0	0	0	0	0	0	128,250
07/30/05	40,250	24	0	0	0	0	0	0	0	0	0	0	128,250
07/31/05	40,250	24	0	0	0	0	0	0	0	0	0	0	128,250

0 = Well not pumping (see text for explanation)

1. The total flow rate calculated from the total influent totalizer volume may vary from the flow rates sum from individual wells.
2. PW-5 was removed from the active pumping well system and replaced with PW-1 on March 12, 2004. The counter was not reset, but PW-1 started at a total gallon count of 199,584,000 gallons.
3. PW-9 was removed from the active pumping well system and replaced with PW-3 on March 31, 2004. The counter was not reset, but PW-3 started at a total gallon count of 181,827,000 gallons.

Table B-1
Summary of Operating Flow Rates
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	PW-4		PW-1		PW-6		PW-7		PW-8		PW-3		Total
	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)
10/01/05	800	24	50,400	24	60,800	24	20,200	24	0	0	63,600	24	188,400
10/02/05	800	24	50,400	24	60,800	24	20,200	24	0	0	63,600	24	188,400
10/03/05	800	24	50,400	24	60,800	24	20,200	24	0	0	63,600	24	188,400
10/04/05	800	24	50,400	24	60,800	24	20,200	24	0	0	63,600	24	188,400
10/05/05	800	24	50,400	24	60,800	24	20,200	24	0	0	63,600	24	188,400
10/06/05	0	0	85,714	24	103,429	24	32,714	24	0	0	107,857	24	342,143
10/07/05	0	0	85,714	24	103,429	24	32,714	24	0	0	107,857	24	342,143
10/08/05	0	0	85,714	24	103,429	24	32,714	24	0	0	107,857	24	342,143
10/09/05	0	0	85,714	24	103,429	24	32,714	24	0	0	107,857	24	342,143
10/10/05	0	0	85,714	24	103,429	24	32,714	24	0	0	107,857	24	342,143
10/11/05	0	0	85,714	24	103,429	24	32,714	24	0	0	107,857	24	342,143
10/12/05	0	0	85,714	24	103,429	24	32,714	24	0	0	107,857	24	342,143
10/13/05	0	0	85,143	24	102,571	24	31,714	24	0	0	107,000	24	338,714
10/14/05	0	0	85,143	24	102,571	24	31,714	24	0	0	107,000	24	338,714
10/15/05	0	0	85,143	24	102,571	24	31,714	24	0	0	107,000	24	338,714
10/16/05	0	0	85,143	24	102,571	24	31,714	24	0	0	107,000	24	338,714
10/17/05	0	0	85,143	24	102,571	24	31,714	24	0	0	107,000	24	338,714
10/18/05	0	0	85,143	24	102,571	24	31,714	24	0	0	107,000	24	338,714
10/19/05	0	0	85,143	24	102,571	24	31,714	24	0	0	107,000	24	338,714
10/20/05	0	0	83,867	24	100,333	24	30,167	24	0	0	105,000	24	331,167
10/21/05	0	0	83,867	24	100,333	24	30,167	24	0	0	105,000	24	331,167
10/22/05	0	0	83,867	24	100,333	24	30,167	24	0	0	105,000	24	331,167
10/23/05	0	0	83,867	24	100,333	24	30,167	24	0	0	105,000	24	331,167
10/24/05	0	0	83,867	24	100,333	24	30,167	24	0	0	105,000	24	331,167
10/25/05	0	0	83,867	24	100,333	24	30,167	24	0	0	105,000	24	331,167
10/26/05	0	0	67,857	24	81,714	24	24,571	24	0	0	85,286	24	269,286
10/27/05	0	0	67,857	24	81,714	24	24,571	24	0	0	85,286	24	269,286
10/28/05	0	0	67,857	24	81,714	24	24,571	24	0	0	85,286	24	269,286
10/29/05	0	0	67,857	24	81,714	24	24,571	24	0	0	85,286	24	269,286
10/30/05	0	0	67,857	24	81,714	24	24,571	24	0	0	85,286	24	269,286
10/31/05	0	0	67,857	24	81,714	24	24,571	24	0	0	85,286	24	269,286

0 = Well not pumping (see text for explanation)

1. The total flow rate calculated from the total influent totalizer volume may vary from the flow rates sum from individual wells.
2. PW-5 was removed from the active pumping well system and replaced with PW-1 on March 12, 2004. The counter was not reset, but PW-1 started at a total gallon count of 199,584,000 gallons.
3. PW-9 was removed from the active pumping well system and replaced with PW-3 on March 31, 2004. The counter was not reset, but PW-3 started at a total gallon count of 181,827,000 gallons.

Table B-1
Summary of Operating Flow Rates
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	PW-4		PW-1		PW-6		PW-7		PW-8		PW-3		Total
	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)
11/01/05	0	0	67,857	24	81,714	24	24,571	24	0	0	85,286	24	269,286
11/02/05	39,429	24	67,857	24	79,571	24	26,714	24	0	0	70,286	24	291,429
11/03/05	39,429	24	67,857	24	79,571	24	26,714	24	0	0	70,286	24	291,429
11/04/05	39,429	24	67,857	24	79,571	24	26,714	24	0	0	70,286	24	291,429
11/05/05	39,429	24	67,857	24	79,571	24	26,714	24	0	0	70,286	24	291,429
11/06/05	39,429	24	67,857	24	79,571	24	26,714	24	0	0	70,286	24	291,429
11/07/05	39,429	24	67,857	24	79,571	24	26,714	24	0	0	70,286	24	291,429
11/08/05	39,429	24	67,857	24	79,571	24	26,714	24	0	0	70,286	24	291,429
11/09/05	5,286	24	56,429	24	53,000	24	9,286	24	0	0	18,571	24	112,571
11/10/05	5,286	24	56,429	24	53,000	24	9,286	24	0	0	18,571	24	112,571
11/11/05	5,286	24	56,429	24	53,000	24	9,286	24	0	0	18,571	24	112,571
11/12/05	5,286	24	56,429	24	53,000	24	9,286	24	0	0	18,571	24	112,571
11/13/05	5,286	24	56,429	24	53,000	24	9,286	24	0	0	18,571	24	112,571
11/14/05	5,286	24	56,429	24	53,000	24	9,286	24	0	0	18,571	24	112,571
11/15/05	0	0	0	0	0	0	0	0	0	0	0	0	0
11/16/05	0	0	0	0	0	0	0	0	0	0	0	0	0
11/17/05	0	0	0	0	0	0	0	0	0	0	0	0	0
11/18/05	0	0	0	0	0	0	0	0	0	0	0	0	0
11/19/05	0	0	0	0	0	0	0	0	0	0	0	0	0
11/20/05	0	0	0	0	0	0	0	0	0	0	0	0	0
11/21/05	0	0	0	0	0	0	0	0	0	0	0	0	0
11/22/05	0	0	0	0	0	0	0	0	0	0	0	0	0
11/23/05	0	0	0	0	0	0	0	0	0	0	0	0	0
11/24/05	0	0	0	0	0	0	0	0	0	0	0	0	0
11/25/05	0	0	0	0	0	0	0	0	0	0	0	0	0
11/26/05	0	0	0	0	0	0	0	0	0	0	0	0	0
11/27/05	0	0	0	0	0	0	0	0	0	0	0	0	0
11/28/05	0	0	0	0	0	0	0	0	0	0	0	0	0
11/29/05	0	0	0	0	0	0	0	0	0	0	0	0	0
11/30/05	0	0	0	0	0	0	0	0	0	0	0	0	0

0 = Well not pumping (see text for explanation)

1. The total flow rate calculated from the total influent totalizer volume may vary from the flow rates sum from individual wells.
2. PW-5 was removed from the active pumping well system and replaced with PW-1 on March 12, 2004. The counter was not reset, but PW-1 started at a total gallon count of 199,584,000 gallons.
3. PW-9 was removed from the active pumping well system and replaced with PW-3 on March 31, 2004. The counter was not reset, but PW-3 started at a total gallon count of 181,827,000 gallons.

Table B-1
Summary of Operating Flow Rates
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	PW-4		PW-1		PW-6		PW-7		PW-8		PW-3		Total
	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)
12/01/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/02/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/03/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/04/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/05/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/06/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/07/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/08/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/09/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/10/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/11/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/12/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/13/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/14/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/15/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/16/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/17/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/18/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/19/05	0	0	0	0	0	0	0	0	0	0	0	0	0
12/20/05	5,286	24	68,429	24	53,000	24	9,286	24	0	0	18,571	24	112,571
12/21/05	8,714	24	93,714	24	112,857	24	40,571	24	0	0	113,571	24	378,571
12/22/05	8,714	24	93,714	24	112,857	24	40,571	24	0	0	113,571	24	378,571
12/23/05	8,714	24	93,714	24	112,857	24	40,571	24	0	0	113,571	24	378,571
12/24/05	8,714	24	93,714	24	112,857	24	40,571	24	0	0	113,571	24	378,571
12/25/05	8,714	24	93,714	24	112,857	24	40,571	24	0	0	113,571	24	378,571
12/26/05	8,714	24	93,714	24	112,857	24	40,571	24	0	0	113,571	24	378,571
12/27/05	8,714	24	93,714	24	112,857	24	40,571	24	0	0	113,571	24	378,571
12/28/05	53,125	24	75,125	24	90,375	24	31,000	24	0	0	94,500	24	354,000
12/29/05	53,125	24	75,125	24	90,375	24	31,000	24	0	0	94,500	24	354,000
12/30/05	53,125	24	75,125	24	90,375	24	31,000	24	0	0	94,500	24	354,000
12/31/05	53,125	24	75,125	24	90,375	24	31,000	24	0	0	94,500	24	354,000

0 = Well not pumping (see text for explanation)

1. The total flow rate calculated from the total influent totalizer volume may vary from the flow rates sum from individual wells.
2. PW-5 was removed from the active pumping well system and replaced with PW-1 on March 12, 2004. The counter was not reset, but PW-1 started at a total gallon count of 199,584,000 gallons.
3. PW-9 was removed from the active pumping well system and replaced with PW-3 on March 31, 2004. The counter was not reset, but PW-3 started at a total gallon count of 181,827,000 gallons.

Table B-1
Summary of Operating Flow Rates
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	PW-4		PW-1		PW-6		PW-7		PW-8		PW-3		Total
	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)
01/01/06	53,125	24	75,125	24	90,375	24	31,000	24	0	0	94,500	24	345,250
01/02/06	53,125	24	75,125	24	90,375	24	31,000	24	0	0	94,500	24	345,250
01/03/06	53,125	24	75,125	24	90,375	24	31,000	24	0	0	94,500	24	345,250
01/04/06	53,125	24	75,125	24	90,375	24	31,000	24	0	0	94,500	24	345,250
01/05/06	58,167	24	83,167	24	100,000	24	33,167	24	0	0	104,500	24	388,667
01/06/06	58,167	24	83,167	24	100,000	24	33,167	24	0	0	104,500	24	388,667
01/07/06	58,167	24	83,167	24	100,000	24	33,167	24	0	0	104,500	24	388,667
01/08/06	58,167	24	83,167	24	100,000	24	33,167	24	0	0	104,500	24	388,667
01/09/06	58,167	24	83,167	24	100,000	24	33,167	24	0	0	104,500	24	388,667
01/10/06	58,167	24	83,167	24	100,000	24	33,167	24	0	0	104,500	24	388,667
01/11/06	41,125	24	58,750	24	70,625	24	20,875	24	0	0	73,875	24	274,750
01/12/06	41,125	24	58,750	24	70,625	24	20,875	24	0	0	73,875	24	274,750
01/13/06	41,125	24	58,750	24	70,625	24	20,875	24	0	0	73,875	24	274,750
01/14/06	41,125	24	58,750	24	70,625	24	20,875	24	0	0	73,875	24	274,750
01/15/06	41,125	24	58,750	24	70,625	24	20,875	24	0	0	73,875	24	274,750
01/16/06	41,125	24	58,750	24	70,625	24	20,875	24	0	0	73,875	24	274,750
01/17/06	41,125	24	58,750	24	70,625	24	20,875	24	0	0	73,875	24	274,750
01/18/06	41,125	24	58,750	24	70,625	24	20,875	24	0	0	73,875	24	274,750
01/19/06	31,857	24	45,286	24	54,571	24	14,286	24	0	0	56,857	24	211,286
01/20/06	31,857	24	45,286	24	54,571	24	14,286	24	0	0	56,857	24	211,286
01/21/06	31,857	24	45,286	24	54,571	24	14,286	24	0	0	56,857	24	211,286
01/22/06	31,857	24	45,286	24	54,571	24	14,286	24	0	0	56,857	24	211,286
01/23/06	31,857	24	45,286	24	54,571	24	14,286	24	0	0	56,857	24	211,286
01/24/06	31,857	24	45,286	24	54,571	24	14,286	24	0	0	56,857	24	211,286
01/25/06	31,857	24	45,286	24	54,571	24	14,286	24	0	0	56,857	24	211,286
01/26/06	58,714	24	84,857	24	101,857	24	25,857	24	0	0	106,429	24	392,714
01/27/06	58,714	24	84,857	24	101,857	24	25,857	24	0	0	106,429	24	392,714
01/28/06	58,714	24	84,857	24	101,857	24	25,857	24	0	0	106,429	24	392,714
01/29/06	58,714	24	84,857	24	101,857	24	25,857	24	0	0	106,429	24	392,714
01/30/06	58,714	24	84,857	24	101,857	24	25,857	24	0	0	106,429	24	392,714
01/31/06	58,714	24	84,857	24	101,857	24	25,857	24	0	0	106,429	24	392,714

0 = Well not pumping (see text for explanation)

1. The total flow rate calculated from the total influent totalizer volume may vary from the flow rates sum from individual wells.

2. PW-5 was removed from the active pumping well system and replaced with PW-1 on March 12, 2004. The counter was not reset, but PW-1 started at a total gallon count of 199,584,000 gallons.

3. PW-9 was removed from the active pumping well system and replaced with PW-3 on March 31, 2004. The counter was not reset, but PW-3 started at a total gallon count of 181,827,000 gallons.

Table B-1
Summary of Operating Flow Rates
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	PW-4		PW-1		PW-6		PW-7		PW-8		PW-3		Total
	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)
02/01/08	58,714	24	84,857	24	101,857	24	25,857	24	0	0	108,429	24	392,714
02/02/08	32,143	24	89,571	24	56,000	24	14,571	24	0	0	58,714	24	215,571
02/03/08	32,143	24	89,571	24	56,000	24	14,571	24	0	0	58,714	24	215,571
02/04/08	32,143	24	89,571	24	56,000	24	14,571	24	0	0	58,714	24	215,571
02/05/08	32,143	24	89,571	24	56,000	24	14,571	24	0	0	58,714	24	215,571
02/06/08	32,143	24	89,571	24	56,000	24	14,571	24	0	0	58,714	24	215,571
02/07/08	32,143	24	89,571	24	56,000	24	14,571	24	0	0	58,714	24	215,571
02/08/08	32,143	24	89,571	24	56,000	24	14,571	24	0	0	58,714	24	215,571
02/09/08	57,250	24	7,500	24	56,571	24	16,143	24	0	0	59,571	24	217,714
02/10/08	57,250	24	7,500	24	56,571	24	16,143	24	0	0	59,571	24	217,714
02/11/08	57,250	24	7,500	24	56,571	24	16,143	24	0	0	59,571	24	217,714
02/12/08	57,250	24	7,500	24	56,571	24	16,143	24	0	0	59,571	24	217,714
02/13/08	58,250	24	85,625	24	102,625	24	28,375	24	0	0	108,125	24	392,375
02/14/08	58,250	24	85,625	24	102,625	24	28,375	24	0	0	108,125	24	392,375
02/15/08	58,250	24	85,625	24	102,625	24	28,375	24	0	0	108,125	24	392,375
02/16/08	58,250	24	85,625	24	102,625	24	28,375	24	0	0	108,125	24	392,375
02/17/08	58,250	24	85,625	24	102,625	24	28,375	24	0	0	108,125	24	392,375
02/18/08	58,250	24	85,625	24	102,625	24	28,375	24	0	0	108,125	24	392,375
02/19/08	58,250	24	85,625	24	102,625	24	28,375	24	0	0	108,125	24	392,375
02/20/08	58,250	24	85,625	24	102,625	24	28,375	24	0	0	108,125	24	392,375
02/21/08	58,500	24	85,125	24	102,125	24	26,750	24	0	0	107,625	24	390,000
02/22/08	58,500	24	85,125	24	102,125	24	26,750	24	0	0	107,625	24	390,000
02/23/08	58,500	24	85,125	24	102,125	24	26,750	24	0	0	107,625	24	390,000
02/24/08	58,500	24	85,125	24	102,125	24	26,750	24	0	0	107,625	24	390,000
02/25/08	58,500	24	85,125	24	102,125	24	26,750	24	0	0	107,625	24	390,000
02/26/08	58,500	24	85,125	24	102,125	24	26,750	24	0	0	107,625	24	390,000
02/27/08	58,500	24	85,125	24	102,125	24	26,750	24	0	0	107,625	24	390,000
02/28/08	58,500	24	85,125	24	102,125	24	26,750	24	0	0	107,625	24	390,000

0 = Well not pumping (see text for explanation)

1. The total flow rate calculated from the total influent totalizer volume may vary from the flow rates sum from individual wells.
2. PW-5 was removed from the active pumping well system and replaced with PW-1 on March 12, 2004. The counter was not reset, but PW-1 started at a total gallon count of 199,584,000 gallons.
3. PW-9 was removed from the active pumping well system and replaced with PW-3 on March 31, 2004. The counter was not reset, but PW-3 started at a total gallon count of 181,827,000 gallons.

Table B-1
Summary of Operating Flow Rates
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	PW-4		PW-1		PW-6		PW-7		PW-8		PW-3		Total
	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)
03/01/06	57,714	24	84,571	24	101,000	24	25,857	24	0	0	106,571	24	385,571
03/02/06	57,714	24	84,571	24	101,000	24	25,857	24	0	0	106,571	24	385,571
03/03/06	57,714	24	84,571	24	101,000	24	25,857	24	0	0	106,571	24	385,571
03/04/06	57,714	24	84,571	24	101,000	24	25,857	24	0	0	106,571	24	385,571
03/05/06	57,714	24	84,571	24	101,000	24	25,857	24	0	0	106,571	24	385,571
03/06/06	57,714	24	84,571	24	101,000	24	25,857	24	0	0	106,571	24	385,571
03/07/06	57,714	24	84,571	24	101,000	24	25,857	24	0	0	106,571	24	385,571
03/08/06	48,750	24	85,000	24	101,750	24	22,000	24	0	0	107,625	24	374,375
03/09/06	48,750	24	85,000	24	101,750	24	22,000	24	0	0	107,625	24	374,375
03/10/06	48,750	24	85,000	24	101,750	24	22,000	24	0	0	107,625	24	374,375
03/11/06	48,750	24	85,000	24	101,750	24	22,000	24	0	0	107,625	24	374,375
03/12/06	48,750	24	85,000	24	101,750	24	22,000	24	0	0	107,625	24	374,375
03/13/06	48,750	24	85,000	24	101,750	24	22,000	24	0	0	107,625	24	374,375
03/14/06	48,750	24	85,000	24	101,750	24	22,000	24	0	0	107,625	24	374,375
03/15/06	48,750	24	85,000	24	101,750	24	22,000	24	0	0	107,625	24	374,375
03/16/06	58,286	24	85,286	24	101,571	24	26,286	24	0	0	106,714	24	386,857
03/17/06	58,286	24	85,286	24	101,571	24	26,286	24	0	0	107,625	24	386,857
03/18/06	58,286	24	85,286	24	101,571	24	26,286	24	0	0	107,625	24	386,857
03/19/06	58,286	24	85,286	24	101,571	24	26,286	24	0	0	107,625	24	386,857
03/20/06	58,286	24	85,286	24	101,571	24	26,286	24	0	0	107,625	24	386,857
03/21/06	58,286	24	85,286	24	101,571	24	26,286	24	0	0	107,625	24	386,857
03/22/06	58,286	24	85,286	24	101,571	24	26,286	24	0	0	107,625	24	386,857
03/23/06	52,000	24	76,000	24	91,000	24	23,000	24	0	0	95,667	24	346,000
03/24/06	50,500	24	76,000	24	91,000	24	23,000	24	0	0	95,667	24	346,000
03/25/06	50,500	24	76,000	24	91,000	24	23,000	24	0	0	95,667	24	346,000
03/26/06	58,000	24	85,714	24	88,375	24	25,857	24	0	0	123,000	24	389,571
03/27/06	58,000	24	85,714	24	88,375	24	25,857	24	0	0	123,000	24	389,571
03/28/06	58,000	24	85,714	24	88,375	24	25,857	24	0	0	123,000	24	389,571
03/29/06	58,000	24	85,714	24	88,375	24	25,857	24	0	0	123,000	24	389,571
03/30/06	58,000	24	85,714	24	88,375	24	25,857	24	0	0	123,000	24	389,571
03/31/06	58,000	24	85,714	24	88,375	24	25,857	24	0	0	123,000	24	389,571

0 = Well not pumping (see text for explanation)

1. The total flow rate calculated from the total influent totalizer volume may vary from the flow rates sum from individual wells.
2. PW-5 was removed from the active pumping well system and replaced with PW-1 on March 12, 2004. The counter was not reset, but PW-1 started at a total gallon count of 199,584,000 gallons.
3. PW-9 was removed from the active pumping well system and replaced with PW-3 on March 31, 2004. The counter was not reset, but PW-3 started at a total gallon count of 181,827,000 gallons.

Table B-1
Summary of Operating Flow Rates
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	PW-4		PW-1		PW-6		PW-7		PW-8		PW-3		Total
	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)
04/01/08	58,000	24	85,714	24	88,375	24	25,857	24	0	0	123,000	24	389,571
04/02/08	58,250	24	88,125	24	103,375	24	23,825	24	0	0	107,125	24	372,625
04/03/08	58,250	24	88,125	24	103,375	24	23,825	24	0	0	107,125	24	372,625
04/04/08	58,250	24	88,125	24	103,375	24	23,825	24	0	0	107,125	24	372,625
04/05/08	58,250	24	88,125	24	103,375	24	23,825	24	0	0	107,125	24	372,625
04/06/08	58,250	24	88,125	24	103,375	24	23,825	24	0	0	107,125	24	372,625
04/07/08	58,250	24	88,125	24	103,375	24	23,825	24	0	0	107,125	24	372,625
04/08/08	58,250	24	88,125	24	103,375	24	23,825	24	0	0	107,125	24	372,625
04/09/08	58,250	24	88,125	24	103,375	24	23,825	24	0	0	107,125	24	372,625
04/10/08	7,000	24	80,857	24	95,857	24	29,429	24	16,286	24	100,286	24	329,714
04/11/08	7,000	24	80,857	24	95,857	24	29,429	24	16,286	24	100,286	24	329,714
04/12/08	7,000	24	80,857	24	95,857	24	29,429	24	16,286	24	100,286	24	329,714
04/13/08	7,000	24	80,857	24	95,857	24	29,429	24	16,286	24	100,286	24	329,714
04/14/08	7,000	24	80,857	24	95,857	24	29,429	24	16,286	24	100,286	24	329,714
04/15/08	7,000	24	80,857	24	95,857	24	29,429	24	16,286	24	100,286	24	329,714
04/16/08	7,000	24	80,857	24	95,857	24	29,429	24	16,286	24	100,286	24	329,714
04/17/08	8,125	24	70,750	24	83,875	24	25,750	24	14,250	24	87,750	24	288,500
04/18/08	8,125	24	70,750	24	83,875	24	25,750	24	14,250	24	87,750	24	288,500
04/19/08	8,125	24	70,750	24	83,875	24	25,750	24	14,250	24	87,750	24	288,500
04/20/08	8,125	24	70,750	24	83,875	24	25,750	24	14,250	24	87,750	24	288,500
04/21/08	8,125	24	70,750	24	83,875	24	25,750	24	14,250	24	87,750	24	288,500
04/22/08	8,125	24	70,750	24	83,875	24	25,750	24	14,250	24	87,750	24	288,500
04/23/08	8,125	24	70,750	24	83,875	24	25,750	24	14,250	24	87,750	24	288,500
04/24/08	8,125	24	70,750	24	83,875	24	25,750	24	14,250	24	87,750	24	288,500
04/25/08	0	0	114,167	24	120,667	24	73,667	24	167	24	142,000	24	321,667
04/26/08	0	0	114,167	24	120,667	24	73,667	24	167	24	142,000	24	321,667
04/27/08	0	0	114,167	24	120,667	24	73,667	24	167	24	142,000	24	321,667
04/28/08	0	0	114,167	24	120,667	24	73,667	24	167	24	142,000	24	321,667
04/29/08	0	0	114,167	24	120,667	24	73,667	24	167	24	142,000	24	321,667
04/30/08	0	0	114,167	24	120,667	24	73,667	24	167	24	142,000	24	321,667

0 = Well not pumping (see text for explanation)

1. The total flow rate calculated from the total influent totalizer volume may vary from the flow rates sum from individual wells.
2. PW-5 was removed from the active pumping well system and replaced with PW-1 on March 12, 2004. The counter was not reset, but PW-1 started at a total gallon count of 199,584,000 gallons.
3. PW-9 was removed from the active pumping well system and replaced with PW-3 on March 31, 2004. The counter was not reset, but PW-3 started at a total gallon count of 181,827,000 gallons.

Table B-1
Summary of Operating Flow Rates
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	PW-4		PW-1		PW-6		PW-7		PW-8		PW-3		Total
	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)
05/01/08	54,000	24	83,429	24	101,571	24	51,714	24	38,143	24	103,571	24	640,286
05/02/08	54,000	24	83,429	24	101,571	24	51,714	24	38,143	24	103,571	24	640,286
05/03/08	54,000	24	83,429	24	101,571	24	51,714	24	38,143	24	103,571	24	640,286
05/04/08	54,000	24	83,429	24	101,571	24	51,714	24	38,143	24	103,571	24	640,286
05/05/08	54,000	24	83,429	24	101,571	24	51,714	24	38,143	24	103,571	24	640,286
05/06/08	54,000	24	83,429	24	101,571	24	51,714	24	38,143	24	103,571	24	640,286
05/07/08	54,000	24	83,429	24	101,571	24	51,714	24	38,143	24	103,571	24	640,286
05/08/08	76,143	24	85,000	24	68,143	24	52,429	24	38,714	24	105,000	24	413,000
05/09/08	76,143	24	85,000	24	68,143	24	52,429	24	38,714	24	105,000	24	413,000
05/10/08	76,143	24	85,000	24	68,143	24	52,429	24	38,714	24	105,000	24	413,000
05/11/08	76,143	24	85,000	24	68,143	24	52,429	24	38,714	24	105,000	24	413,000
05/12/08	76,143	24	85,000	24	68,143	24	52,429	24	38,714	24	105,000	24	413,000
05/13/08	76,143	24	85,000	24	68,143	24	52,429	24	38,714	24	105,000	24	413,000
05/14/08	76,143	24	85,000	24	68,143	24	52,429	24	38,714	24	105,000	24	413,000
05/15/08	69,143	24	86,857	24	0	0	53,571	24	39,143	24	107,571	24	352,714
05/16/08	69,143	24	86,857	24	0	0	53,571	24	39,143	24	107,571	24	352,714
05/17/08	69,143	24	86,857	24	0	0	53,571	24	39,143	24	107,571	24	352,714
05/18/08	69,143	24	86,857	24	0	0	53,571	24	39,143	24	107,571	24	352,714
05/19/08	69,143	24	86,857	24	0	0	53,571	24	39,143	24	107,571	24	352,714
05/20/08	69,143	24	86,857	24	0	0	53,571	24	39,143	24	107,571	24	352,714
05/21/08	69,143	24	86,857	24	0	0	53,571	24	39,143	24	107,571	24	352,714
05/22/08	63,875	24	83,714	24	101,375	24	51,000	24	38,000	24	102,500	24	399,690
05/23/08	63,875	24	83,714	24	101,375	24	51,000	24	38,000	24	102,500	24	399,690
05/24/08	63,875	24	83,714	24	101,375	24	51,000	24	38,000	24	102,500	24	399,690
05/25/08	63,875	24	83,714	24	101,375	24	51,000	24	38,000	24	102,500	24	399,690
05/26/08	63,875	24	83,714	24	101,375	24	51,000	24	38,000	24	102,500	24	399,690
05/27/08	63,875	24	83,714	24	101,375	24	51,000	24	38,000	24	102,500	24	399,690
05/28/08	63,875	24	83,714	24	101,375	24	51,000	24	38,000	24	102,500	24	399,690
05/29/08	63,875	24	83,714	24	101,375	24	51,000	24	38,000	24	102,500	24	399,690
05/30/08	64,333	24	83,714	24	102,500	24	51,167	24	37,833	24	103,667	24	446,667
05/31/08	64,333	24	83,714	24	102,500	24	51,167	24	37,833	24	103,667	24	446,667

0 = Well not pumping (see text for explanation)

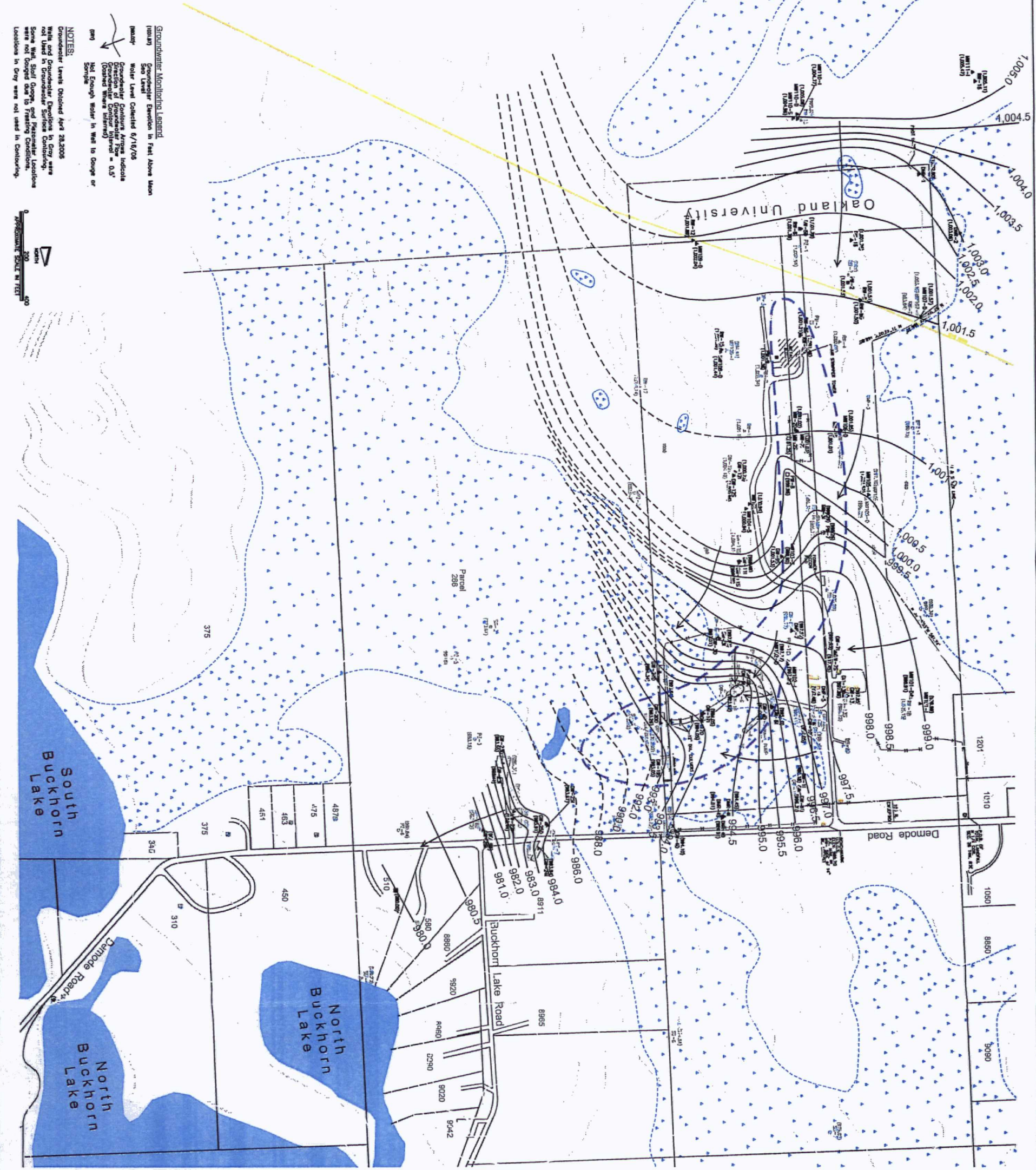
1. The total flow rate calculated from the total influent totalizer volume may vary from the flow rates sum from individual wells.
2. PW-5 was removed from the active pumping well system and replaced with PW-1 on March 12, 2004. The counter was not reset, but PW-1 started at a total gallon count of 199,584,000 gallons.
3. PW-9 was removed from the active pumping well system and replaced with PW-3 on March 31, 2004. The counter was not reset, but PW-3 started at a total gallon count of 181,827,000 gallons.

Table B-1
Summary of Operating Flow Rates
Rose Township, Demode Road Site
Groundwater Extraction and Treatment System
Units as Given

Date	PW-4		PW-1		PW-6		PW-7		PW-8		PW-3		Total
	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)	Hours of Operation	Flow Rate (gallons/day)
06/06/06	64,333	24	83,714	24	102,500	24	51,167	24	37,833	24	103,667	24	446,667
06/07/06	64,333	24	83,714	24	102,500	24	51,167	24	37,833	24	103,667	24	446,667
06/08/06	64,333	24	83,714	24	102,500	24	51,167	24	37,833	24	103,667	24	446,667
06/09/06	64,333	24	83,714	24	102,500	24	51,167	24	37,833	24	103,667	24	446,667
06/10/06	64,286	24	84,286	24	102,714	24	51,143	24	37,143	24	103,714	24	446,571
06/11/06	64,286	24	84,286	24	102,714	24	51,143	24	37,143	24	103,714	24	446,571
06/12/06	64,286	24	84,286	24	102,714	24	51,143	24	37,143	24	103,714	24	446,571
06/13/06	64,286	24	84,286	24	102,714	24	51,143	24	37,143	24	103,714	24	446,571
06/14/06	64,286	24	84,286	24	102,714	24	51,143	24	37,143	24	103,714	24	446,571
06/15/06	64,286	24	84,286	24	102,714	24	51,143	24	37,143	24	103,714	24	446,571
06/16/06	64,286	24	84,286	24	102,714	24	51,143	24	37,143	24	103,714	24	446,571
06/17/06	59,143	24	92,560	24	94,714	24	46,714	24	34,857	24	95,714	24	420,286
06/18/06	59,143	24	92,560	24	94,714	24	46,714	24	34,857	24	95,714	24	420,286
06/19/06	59,143	24	92,560	24	94,714	24	46,714	24	34,857	24	95,714	24	420,286
06/20/06	59,143	24	92,560	24	94,714	24	46,714	24	34,857	24	95,714	24	420,286
06/21/06	59,143	24	92,560	24	94,714	24	46,714	24	34,857	24	95,714	24	420,286
06/22/06	59,143	24	92,560	24	94,714	24	46,714	24	34,857	24	95,714	24	420,286
06/23/06	59,143	24	92,560	24	94,714	24	46,714	24	34,857	24	95,714	24	420,286
06/24/06	26,667	24	100,833	24	43,667	24	21,333	24	16,000	24	44,167	24	257,333
06/25/06	26,667	24	100,833	24	43,667	24	21,333	24	16,000	24	44,167	24	257,333
06/26/06	26,667	24	100,833	24	43,667	24	21,333	24	16,000	24	44,167	24	257,333
06/27/06	26,667	24	100,833	24	43,667	24	21,333	24	16,000	24	44,167	24	257,333
06/28/06	26,667	24	100,833	24	43,667	24	21,333	24	16,000	24	44,167	24	257,333
06/29/06	26,667	24	100,833	24	43,667	24	21,333	24	16,000	24	44,167	24	257,333
06/30/06	15,727	24	50,750	24	85,166	24	30,417	24	21,833	24	62,750	24	244,583
07/01/06	15,727	24	50,750	24	85,166	24	30,417	24	21,833	24	62,750	24	244,583
07/02/06	15,727	24	50,750	24	85,166	24	30,417	24	21,833	24	62,750	24	244,583
07/03/06	15,727	24	50,750	24	85,166	24	30,417	24	21,833	24	62,750	24	244,583
07/04/06	15,727	24	50,750	24	85,166	24	30,417	24	21,833	24	62,750	24	244,583
07/05/06	15,727	24	50,750	24	85,166	24	30,417	24	21,833	24	62,750	24	244,583

0 = Well not pumping (see text for explanation)

1. The total flow rate calculated from the total influent totalizer volume may vary from the flow rates sum from individual wells.
2. PW-5 was removed from the active pumping well system and replaced with PW-1 on March 12, 2004. The counter was not reset, but PW-1 started at a total gallon count of 199,584,000 gallons.
3. PW-9 was removed from the active pumping well system and replaced with PW-3 on March 31, 2004. The counter was not reset, but PW-3 started at a total gallon count of 181,827,000 gallons.



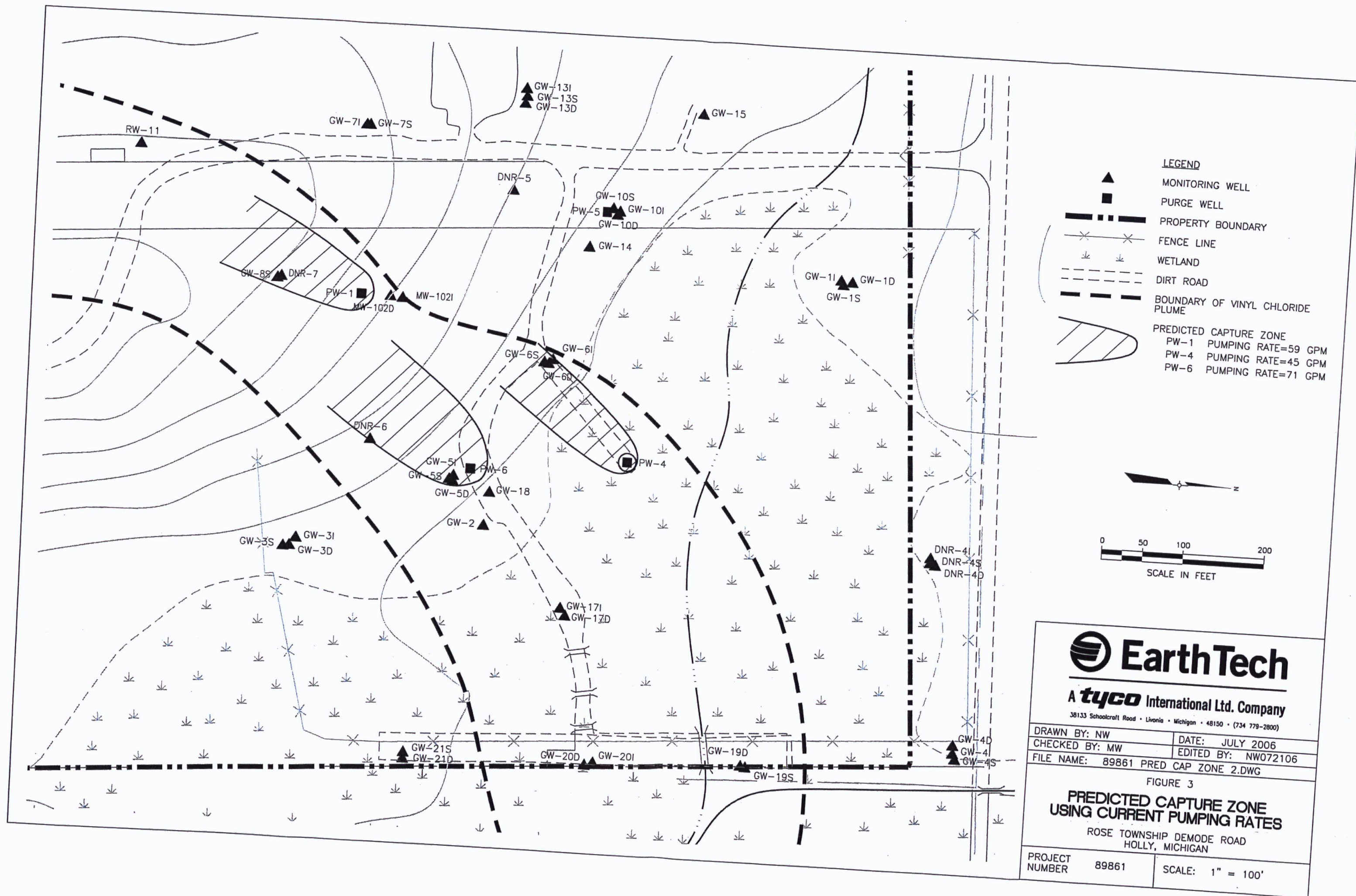
Rose Township Demode Road
Holly, Michigan

Figure 2
Groundwater Level Elevation Contours
APRIL 2006



EarthTech
A Tyco International Ltd. Company

LIVONA, MICHIGAN							
BOD							
DEC							
CHK							
APP							
Copyright © EARTH TECH, Inc., All Rights Reserved				100	REV 00000000	NAME	DATE



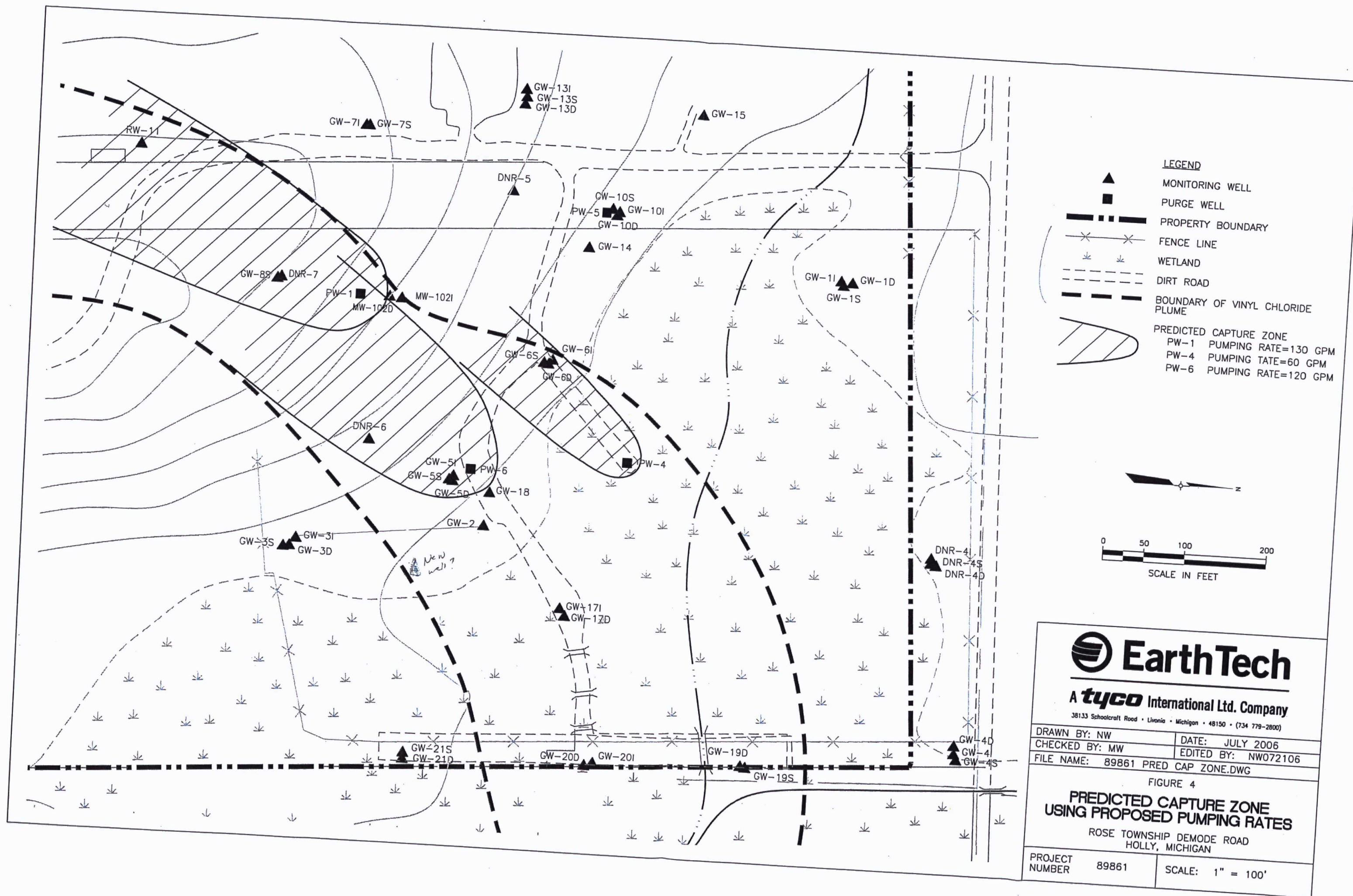


Figure 5

Current System (May 2006)

PW-1 59 gpm PW-3 72 gpm PW-4 45 gpm PW-6 71
gpm PW-7 37 gpm PW-8 26 gpm

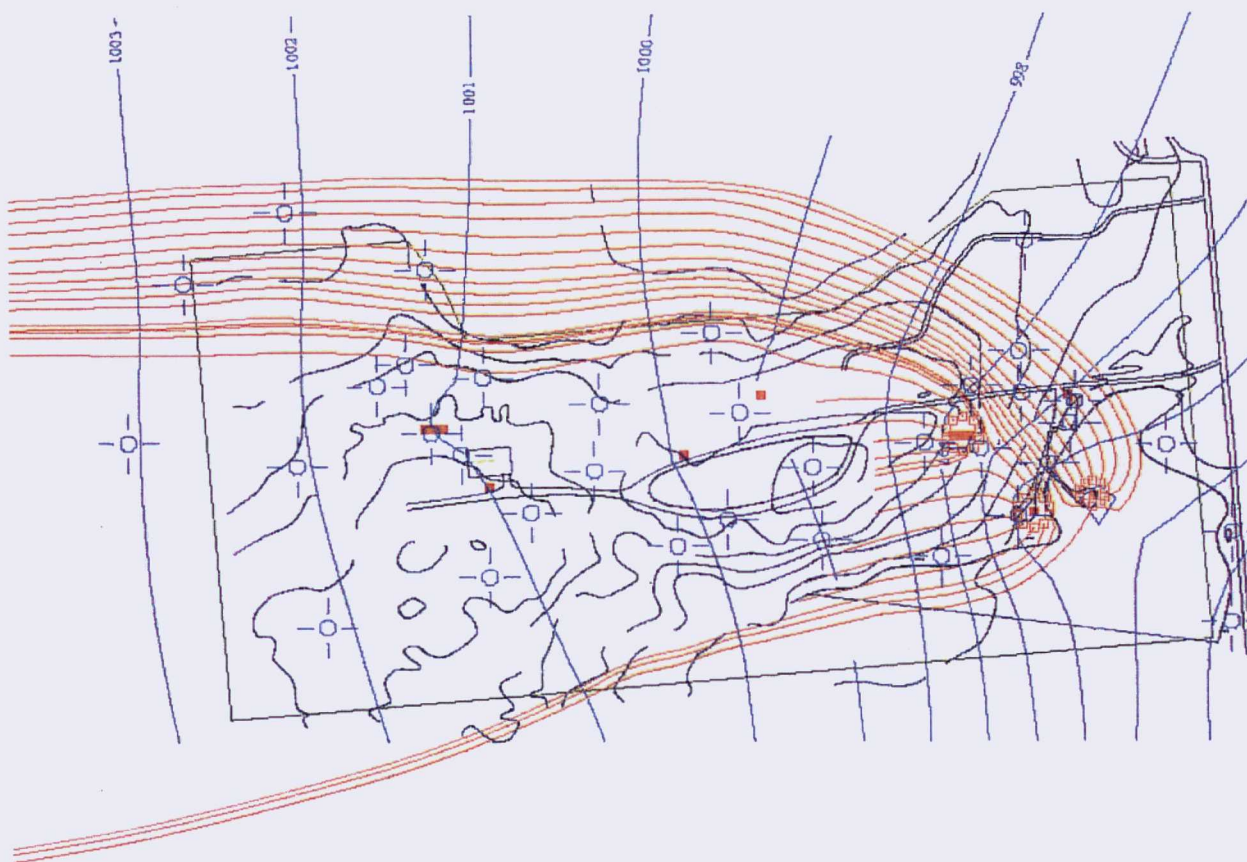


Figure 6

PW-1 130 gpm PW-4 60 gpm PW-6 120 gpm
PW-3 30 gpm PW-7 30 gpm PW-8 30 gpm

